

CTO

BUSINESS TECHNOLOGY LEADERSHIP

How a \$25 million payment system created a \$300 million backlog in six short months. A lesson in how not to run a Web services project.

MAINE'S MEDICAID MISTAKES

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BY ALLAN HOLMES

OFFSHORING

New data shows that after three years the ROI begins to decline. How to fight the trend.

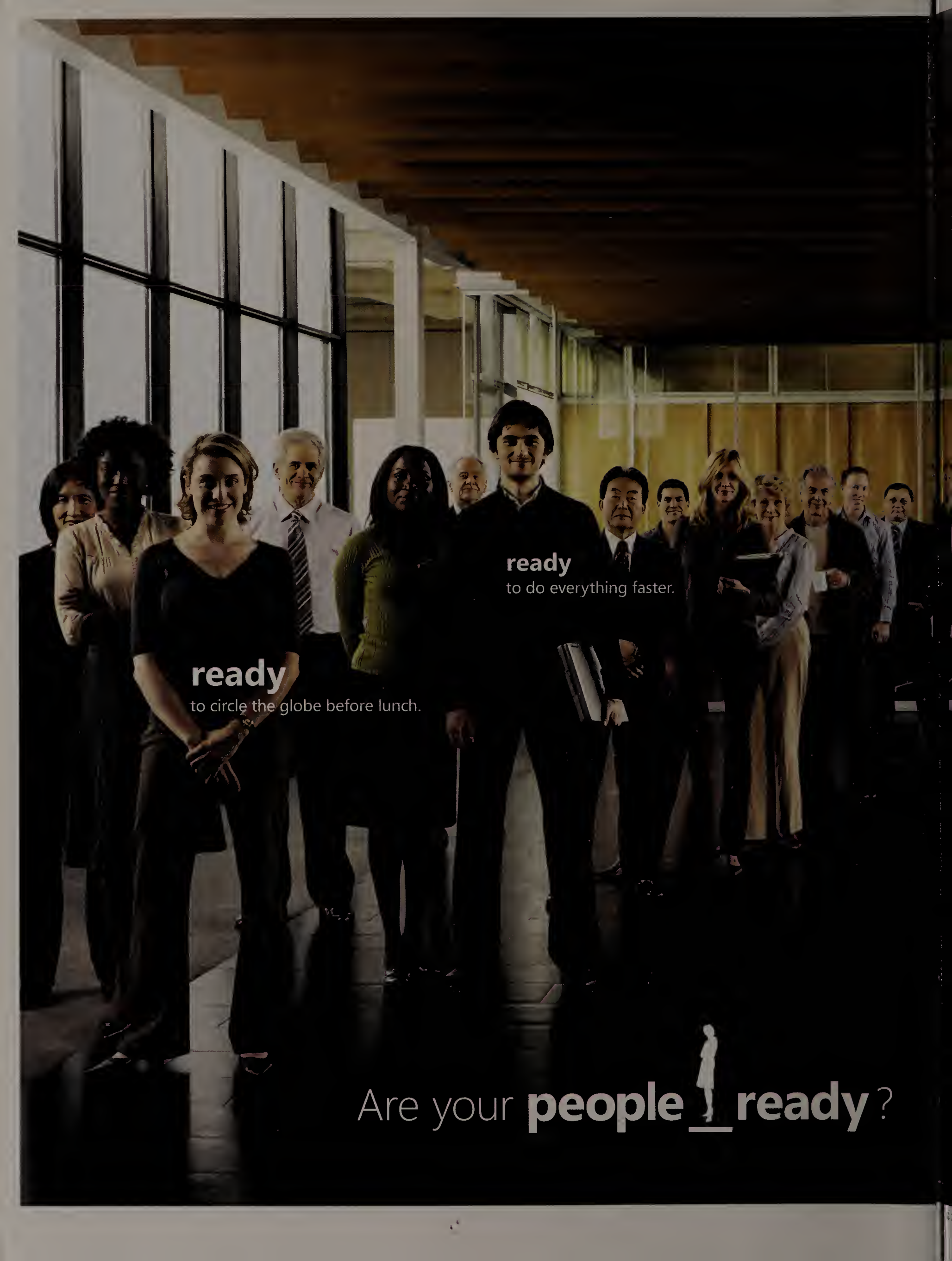
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ENERGY EFFICIENT I.T.

Tips for reducing consumption without sacrificing computing power.

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"I can now see the light at the end of the tunnel," says Maine CIO Dick Thompson.



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THE ESSENTIAL ELEMENTS OF IT GOVERNANCE



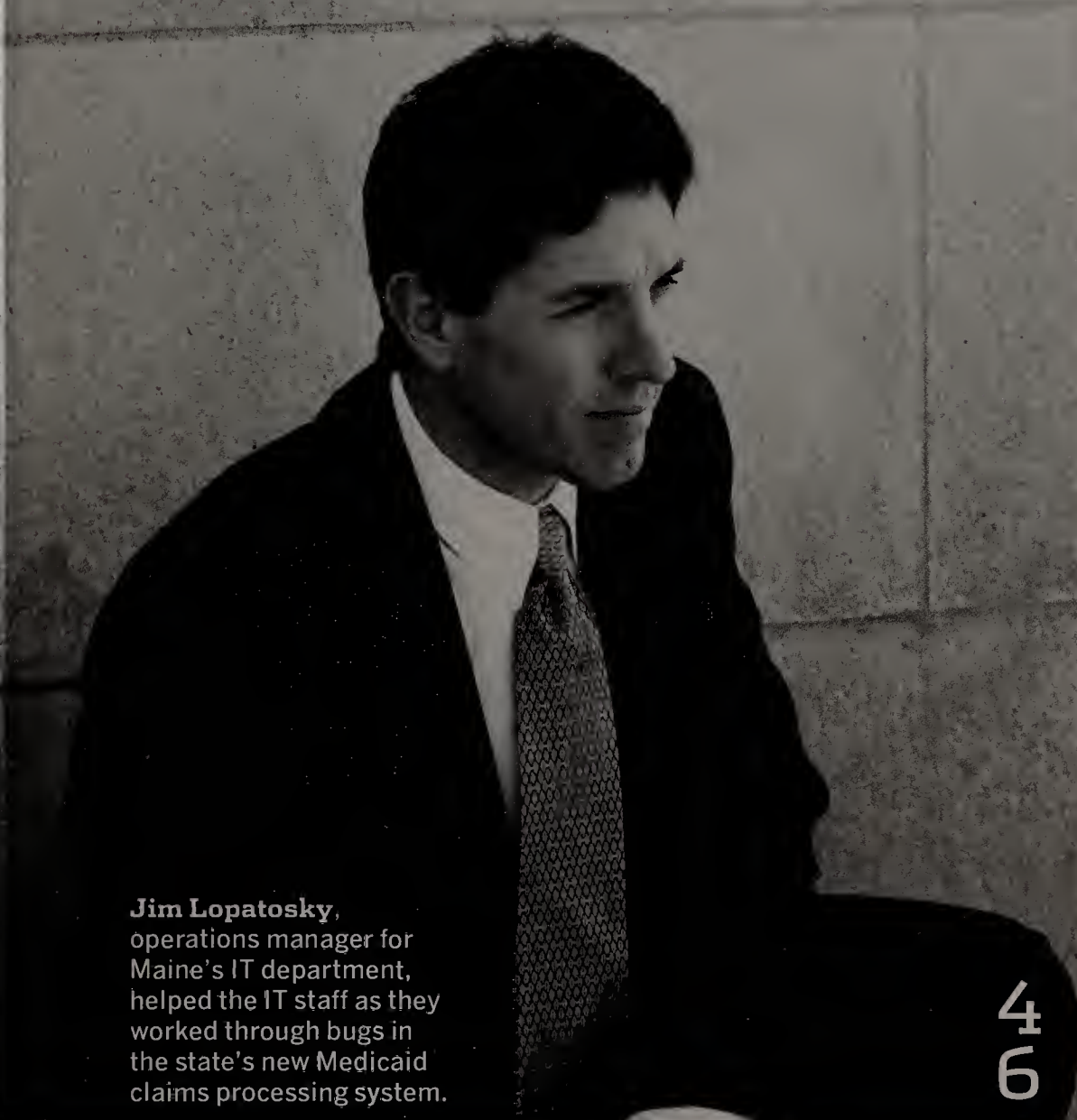
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Jim Lopatosky, operations manager for Maine's IT department, helped the IT staff as they worked through bugs in the state's new Medicaid claims processing system.

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By Susannah Patton

[ONLINE
EXCLUSIVE]

IT Value

CREDIT WHERE CREDIT IS DUE |

WWW.CIO.COM/041506

Productivity has been increasing steadily for years and CIOs think IT deserves a lot of the credit. But proving that hasn't been easy. That's why we asked MIT's Erik Brynjolfsson about his new research on metrics and IT best practices. **By C.G. Lynch**

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Wh@t's Hot Online

NEWS AND MORE NEWS

CIO's News Alerts (www.cio.com/news)—our daily roundup of the top business news items you need to know—has proven very popular. Now two additional news feeds join it:

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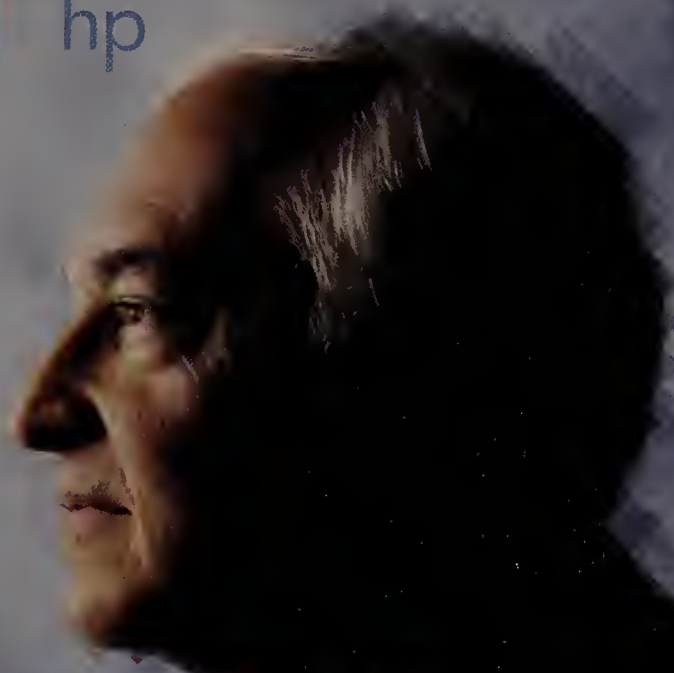
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27 Reasons to Read This Magazine

That's the number of actionable tips and solutions you'll find in the current issue of *CIO*

A little over a year ago, we went through an exercise where we pinned up the year's covers and asked a group of CIOs to react to them. What we heard from them was surprising. After more than a decade of having our readers tell us that they wanted more failure stories (because IT is hard and there was more to learn from analyzing the setbacks their peers encountered than from celebrating their successes) and fewer articles about the CIO role (what we call, "It's all about you" stories), this group of IT executives practically recoiled from those covers reflecting the former and were drawn to the latter like kids to candy.

What was up with that?

The backlash against IT a few years ago (a.k.a. the "Does IT Matter?" debate) put CIOs on the defensive, forcing them to justify everything they did and how they did it. Any failure, anywhere, was seen as part of the mounting evidence against IT and against them. In short, CIOs felt beat up, and failure stories on the cover of *CIO* felt like a personal attack.

So why are we putting "Maine's Medicaid Mistakes" on the cover? There are four reasons:

- It's an important and dramatic story. IT is a powerful tool; it can be dangerous in the hands of inexperienced operators. In this case, it wasn't just corporate profits at stake; it was people's health and welfare. As a journalistic enterprise, our responsibility is to report such stories.
- The mistakes made in this project were basic ones, Project Management 101. In 2006, there's no excuse for CIOs to be making these kinds of mistakes—or for organizations to be undertaking such critical projects without adequate oversight and project management discipline in place.
- I believe the climate has changed. CIOs can stop feeling so defensive when they read about bad things happening in other organizations. Sometimes, it's *not* all about you!
- Finally, and perhaps most importantly, this story is filled with important lessons. Which brings me back to where I began.

In addition to the 10 essential tips for successful project management you'll find in our cover story (by Washington Bureau Chief Allan Holmes, beginning on Page 46), this issue also delivers seven steps to a successful offshore relationship ("The Three—or Four—Year Itch," Page 56); three solutions to lowering your data center energy costs ("Powering Down," Page 68); and MIT economist Erik Brynjolfsson's seven practices of highly effective organizations (though you'll have to visit our website at www.cio.com/041506 for that one). If you do the math, that makes 27. And that's not even counting our columns and departments.

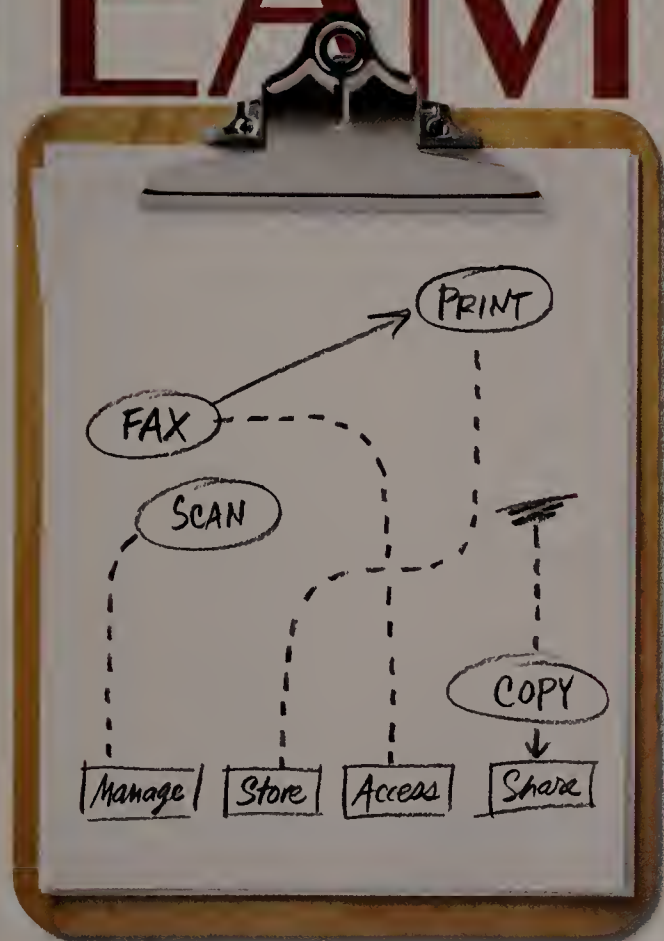
So while our cover is dramatic and news-driven, our content is practical and useful. The cover is *not* about you, but the articles, we hope, will serve you well in your role as CIOs.

Let me know how we did.

The backlash against IT a few years ago (a.k.a. the "Does IT Matter?" debate) put CIOs on the defensive, forcing them to justify everything they did and how they did it.

Abbie Lundberg, Editor in Chief
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TEAM PLAYER



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The Competitive Advantage

In a technology company, who's more important than the CIO?



On July 11, 2005, Hewlett-Packard announced with great fanfare that former Dell CIO Randy Mott would be joining the company. This was one of HP CEO Mark Hurd's first significant hires, and it deserved the applause it received. However, what went conspicuously underreported was the identity of Mott's successor, Susan Sheskey.

Dell does more than \$54 billion in sales but this past year saw its stock price fall from \$42 a share to \$29. In today's times, change is a fact of business life.

Yet what has not changed is that Dell's competitive advantage is closely tied to its ability to execute on technology. And with Sheskey in the CIO post, Dell is still executing.

As we've frequently noted in *CIO*, succession planning is critical to business success, and never more so than when markets are volatile. At this point, it seems that Mott lived up to his succession-planning responsibilities. (For tips on succession planning, see "Nothing Succeeds Like Succession," www.cio.com/050105.) Having had the opportunity to meet with Sheskey recently, it's clear to me that her business technology floor plan for Dell is to push the boundaries of innovation.

Sheskey discussed her goals for Dell, and I think they're relevant for every CIO who is leading the charge for innovation:

- Create an IT environment that can differentiate your specific customer interactions;
- Make your IT architecture a model of excellence that your customers can learn from;
- Have your IT organization become a destination of choice for IT professionals.

Spend enough time inside Dell and you'll hear the mantra "Discipline to Delivery," which describes the company's desire to move from strategy to process to execution at the speed of light. Creating an environment where one can achieve business leadership, technology leadership and career development enables one not only to chant this mantra but to live it.

Sheskey and her team are on their way to generating their own press clippings. I would enjoy hearing from you as to what your goals and aspirations are for your IT team. Please send them to me.

Michael Friedenber, President and CEO
mfriedenber@cxo.com

P.S. In last month's column I asked for best practices for people and organizations currently paralyzed by change. A lot of you sent me General Patton's famous quote, "Lead, follow, or get out of the way." Sound advice and please keep the feedback coming.



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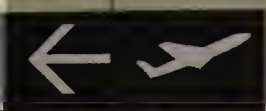
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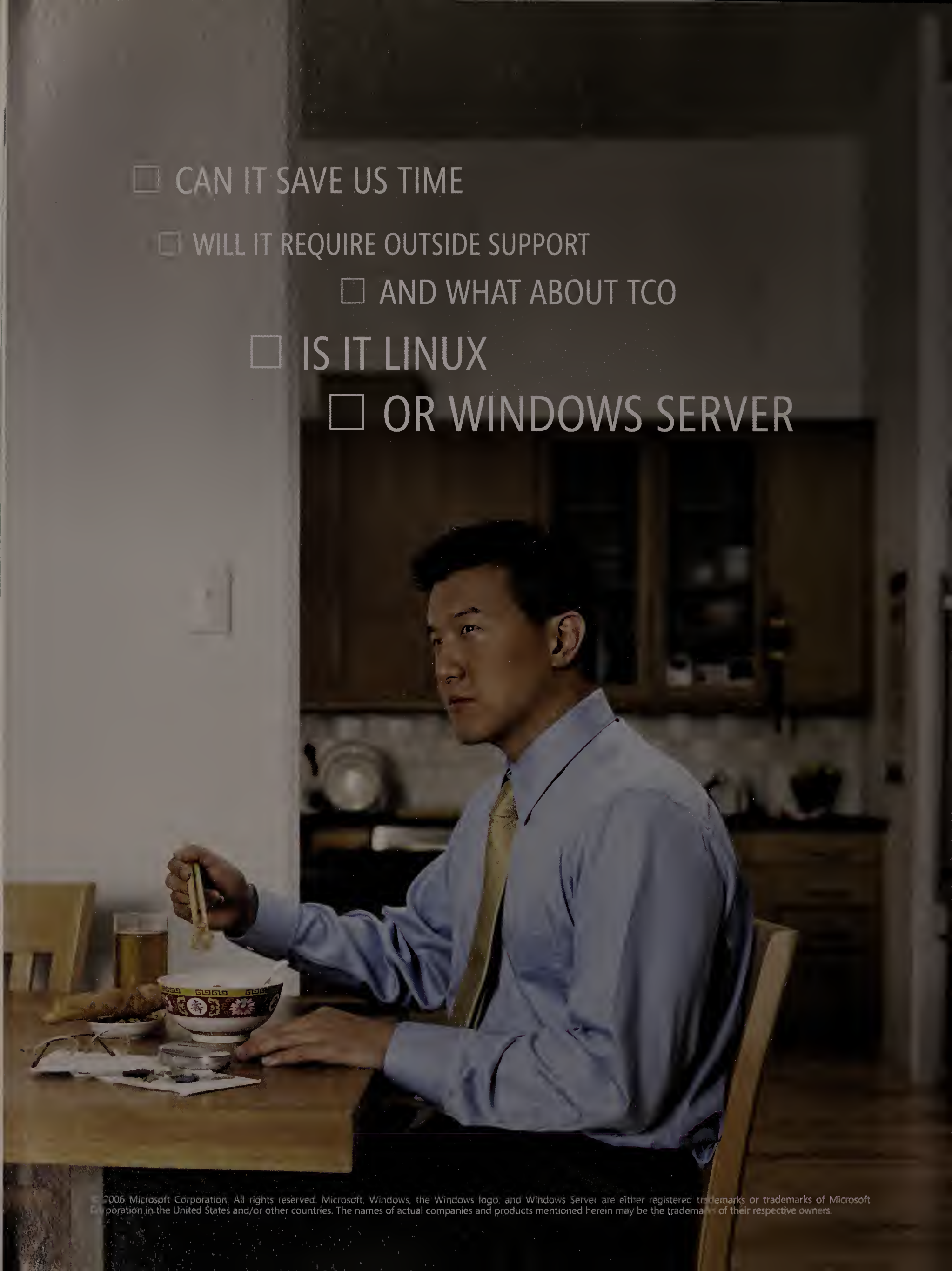
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trendlines

EDITED BY ELANA VARON

NEW * HOT * UNEXPECTED

The Next Compliance HEADACHE

RECYCLING Proper disposal of computer equipment may be the right thing to do, but increasingly, it is also a legal requirement.

A California law that took effect in February makes it illegal for households and small businesses to toss out “universal waste,” which includes cathode ray tubes, products that contain mercury, batteries and other toxic substances included in electronics. The prohibition was already in place for enterprises, but the law’s extension is one of the electronic-waste regulations grabbing attention this year. A European Union directive that takes effect in July goes further than any law in the United States, requiring that electrical and electronics equipment distributed there be free of certain toxins.

While there is no similar federal law in the United States—yet—the U.S. Environmental Protection Agency does have regulations regarding how toxic waste, including materials used in electronics, must be handled and disposed of, notes Jonathan Zigman, VP for CSI Leasing, an IT leasing company. His advice to CIOs is to behave as though their companies are going to be audited by the EPA regarding toxic equipment handling and

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We Don't Need No Stinkin' Batteries

MOBILE COMPUTING MIT researchers have found a way to extend the working life of mobile computers by drawing power from ultracapacitors rather than batteries.

Ultracapacitors are still three to five years away from becoming the main power source for laptops and handhelds, although they're already used for backup power in many small consumer products, according to Joel Schindall, a professor in MIT's Department of Electrical Engineer-

ing and Computer Science.

The new device is called a nanotube-enhanced ultracapacitor, or NEU. Capacitors store energy as an electrical field, which is more efficient than standard batteries that generate energy from chemical reactions. Ultracapacitors are even more efficient. The drawback is size—they need to be larger than batteries to hold the same charge.

MIT researchers solved this problem by taking advantage of the enormous surface

area of nanotubes: molecular-scale straws of carbon atoms that enable ultracapacitors to store electrical fields at the atomic level.

The new technology could shake up the computer business, where energy efficiency is becoming a selling point. (See “Powering Down,” Page 68.)

How fast a battery charges is also important to users. A cell phone powered by MIT's ultracapacitor could completely recharge in just a few seconds.

—Ben Ames



The People Who Really Run IT

KUDOS They are skilled project managers. They combine negotiating savvy with good customer service. They are entrepreneurial and good at solving problems. And they understand the business.

We're not talking about your managers. Or your business analysts. They may have some of these skills. But the one person on your team who has aptitude in all these areas—and makes you look good in the process—is your administrative assistant. According to the International Association of Administrative Professionals, executive assistants have broader skill sets than most professionals (probably, even you).

In recognition of Administrative Professionals Day (April 26), we're honoring two executive assistants, nominated by their CIOs, as the winners of CIO's Best Administrative Assistant Contest: Lee Ann Fisher, assistant to Edward Chapel, associate VP of IT with Montclair State University; and Jessica Raichl, assistant to CIO Eugene Nizker with Custom House Currency Exchange. Driven by passion for their work and a caring spirit, each keeps the IT department running smoothly. Two other nominees—Carol Nash, assistant to Edward Marx, CIO with University Hospitals Health System; and Darlene Sillick, assistant to Cardinal Health CIO Jody Davids—were selected for honorable mentions by CIO editors.

At Montclair State, Fisher is "redefining what constitutes the admin role here," says Chapel, who considers her part of his management team. Hyper-conscious of the university's tight budget, Fisher established new processes for evaluating the IT staff's travel plans, saving the department \$20,000 a year.

Before Nizker hired Raichl three years ago, he required her to submit three writing samples. But her skill at correspondence is just one of the qualities that led Nizker to describe her as the "glue" that holds his department together. "She guards me from problems that I will never know about," he says, and protects the entire team. A few months ago, the local police called Nizker's office insisting they needed to ask questions about a member of the IT staff. Concerned about appearances, Raichl told the police they could not come into the office, offering instead to meet them elsewhere. Ultimately, the incident turned out to be a big misunderstanding, and Raichl's quick thinking and protective instincts prevented gossip and any further problems.

Nash, Marx's assistant at University Hospitals Health System, received an honorable mention for what her boss says is her "customer-service talent and passion." She's an expert at calming angry business users when they're having a technical problem. Cardinal Health's Sillick, meanwhile, is being recognized for her compassion and friendship. When Davids' son died in Iraq last year, Sillick notified contacts who Davids knew personally, arranged travel, hotel and transportation for relatives, and organized the efforts of those who wanted to help. "I could not have gotten through that period without Darlene," Davids says.

—Stephanie Overby



Lee Ann Fisher (top) and **Jessica Raichl**, winners of CIO's Best Administrative Assistant Contest

Recycling

Continued from Page 15

disposal, whether or not such an audit really is likely.

"Assume that the strictest laws are going to be enforced everywhere," Zigman says, "and it's going to make your life much easier." He recommends that CIOs appoint a coordinator to be responsible for an e-waste plan. Besides a written policy, which is required by the EPA, Zigman says, CIOs should perform due diligence on third-party vendors to ensure, for instance, that they can certify what happens to equipment once it is hauled away.

Also on the federal level, lawmakers involved with the Congressional E-Waste Working Group are pushing for a national recycling plan. And in February, the U.S. Postal Service launched an initiative to form partnerships with contractors to handle items disposed of in a nationwide e-waste recycling program for consumers and small businesses.

The E.U. directive requires that electrical and electronics equipment manufactured for distribution in E.U. nations after July 1 must be free of lead, mercury, cadmium, chromium and other specified toxins. (There are exemptions for certain medical and other devices.) Over time the directive will mean that electronics and electrical products globally will be more environmentally friendly, since manufacturers aren't likely to produce separate goods for distribution outside of the European Union, according to IT analysts.

Meanwhile, analyst Roger Kay, president of Endpoint Technologies Associates, appeals to the conscience of those making decisions about recycling and equipment disposal. "From my perspective, there's no question about compliance. Not only is it illegal in many states to dump [e-waste], it's just the wrong thing to do," he says.

—Nancy Weil



Workforce Crisis: How to Beat the Coming Shortage of Skills and Talent

By Ken Dychtwald, Tamara J. Erickson and Robert Morison
Harvard Business School Press, 2006, \$29.95

Sign Up Top Workers Before They're Hot

Planning ahead for the coming baby boomer retirement binge

BOOK REVIEW In the coming war for talent, organizations that recruit and retain top-notch workers before the labor shortfall becomes acute will possess a competitive advantage. So say authors Ken Dychtwald, Tamara Erickson and Robert Morison in *Workforce Crisis: How to Beat the Coming Shortage of Skills and Talent*.

Much ink has been spilled elsewhere on the oft-cited estimate of a 10 million worker shortfall in the United States by 2010. More worrisome to the authors is the skills crunch they believe will precede this labor shortage.

IT has felt the pinch of this for some time: Witness the current shortage of

information-technology graduates. But the perfect storm of baby boomer retirements and a deficit of young workers means the situation is poised to go from bad to worse unless employers take steps now to secure their talent pool. *Workforce Crisis* offers a road map for getting ahead now, by rewriting "the employment deal" with workers today.

In part, this means abandoning one-size-fits-all HR and becoming flexible—in work arrangements, education, and compensation and benefits—to accommodate workers in three distinct groups: mature workers (55 or over), midcareer workers (35-54 years old) and young

workers (18-34 years old).

The particulars will vary. An older worker may prefer phased-retirement or retiree-return programs; a midcareer employee may need a sabbatical or leadership development to relaunch a career; and a young worker may crave decision-making responsibility or an engaging, stimulating workplace.

The book's emphasis is on early action for dealing with the changing workforce. To that end, it is filled with case studies and best practices, as well as advice for undertaking a workforce analysis and overcoming barriers to change.

—Stephanie Gelston

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A Better Way to Search for Trouble

NETWORK MANAGEMENT

Sifting through performance logs saps time and money from just about every enterprise. System administrators who oversee networks of hundreds of servers might spend entire days reading files from a variety of devices to monitor overall network health. For even the most meticulous among us, this work is tedious.

Splunk is designed to change this. The software, from a startup of the same name, is a system log search tool that empowers system administrators to scrutinize their network performance logs more easily. While other log management tools exist, few if any cull data from every part of a network.

Think of Splunk as Google for system logs. Customers configure the tool to read logs from different network outposts. To use it, system administrators set their sights on a type of record (say one that would indicate a distributed denial-of-service attack), type a relevant phrase in a search box, and sit back while the software searches for the appropriate report.

The product can be used in several areas, including monitoring network security and keeping tabs on changes to a server. CEO Michael Baum estimates that Splunk can cut log management time to mere minutes in an average-size company and reduce the mean time to recovery after a network failure.

Glenn Evans, lead network engineer for Interop, says he used the software last year to keep tabs on the network for the annual InteropNet conference from one central location, analyzing network data immediately as it churned out. "Having Splunk was like having a second or third pair of eyes," he says.

—Matt Villano

washingtonwatch

EDITED BY ALLAN HOLMES

Keeping Internet Pipes Free of Charge

Bills would prevent telecoms from assessing fees to competitors for traffic on broadband networks

As Congress debates on major telecommunications legislation, lawmakers are considering proposals that would prohibit large telecom providers from charging fees to online content companies that use their broadband networks.

of Pac-West Telecom, is worried about. In January, Putnam's company announced an alliance with VeriSign to offer converged VoIP and other data services. Without a Net neutrality law, Putnam worries that large broadband providers will

be tempted to charge more for services they carry for competitors or provide faster access to their own customers and affiliates. "It will not be a level playing field," he says.

Recently, officials from AT&T, BellSouth and Verizon have complained



The measures would prevent the vendors from blocking services or providing slower download times for other vendors' services.

A so-called Net neutrality law would ensure that broadband customers have unfettered access to any legal content or service offered online and could operate any legal device, such as a voice-over-IP phone, no matter which vendor provides it. Backers of the idea (advocated by Rep. Rick Boucher, D-Va., and Sen. Ron Wyden, D-Ore., among others) say that without a law, the danger exists for large telecom and cable companies—which control most of the broadband pipes in the United States—to discriminate against smaller competitors who provide their services through the larger companies' networks.

That's what Todd Putnam, CIO

about companies such as Google riding for "free" over their broadband networks. (Google counters that it pays plenty for its own broadband access.) These large providers told Congress in February that they have no intention of blocking or slowing services to websites customers want.

However, DSL provider BellSouth (which is being acquired by AT&T) has proposed charging content providers an additional fee for improved network quality, including faster customer access, on its DSL network. AT&T, meanwhile, has proposed creating a high-speed network for its broadband television service separate from the rest of the Internet. The companies argue that they need ways to pay for building the faster networks.

—Grant Gross

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by the numbers

BY DIANN DANIEL

SOA Adoption Gains Momentum

Companies target mission-critical areas first



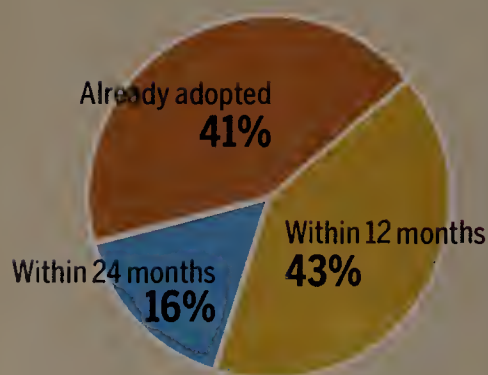
Implementation of service-oriented architecture (SOA) is on the rise, reports the Yankee Group. The consultancy's survey of 306 U.S. IT executives found that 84 percent had an SOA project or would be starting one within the next year.

SOA is an approach to software design that promotes the development and integration of reusable components that are based on elements of a business process. For example, if the elements of a business process required for customers to order a product online (such as checking inventory, looking up the customer record, checking credit) reside on different systems, writing each component as a service allows the speedy integration and delivery of the information needed to complete the transaction. Because services can be changed without affecting users, SOA reduces development time, lowers costs and allows business processes to be reconfigured easily.

Because of the cost savings, the best areas to start applying SOA are those with the most impact on the bottom line, says Tom Dwyer, research director with the Yankee Group. He adds that for most companies surveyed, these areas are customer-facing business processes, which affect revenue most directly.

Among respondents that have already implemented SOA projects, most targeted customer-facing websites or portals (30 percent) and help desk and customer support applications (29 percent). But the future belongs to internal integration. Seventy-three percent of respondents said they are evaluating or currently deploying SOA projects to integrate internal business applications, and 72 percent were looking into or currently implementing it to aggregate data and content.

Plans for SOA Deployment



Top Areas for SOA Investment

Customer-facing processes, internal integration and data accessibility are priorities

Already Implemented

- 30% Customer-facing website/portals
- 29% Help desk and customer support
- 25% Integration of internal business applications

Evaluating or Deploying

- 73% Integration of internal business applications
- 72% Data/content aggregation and accessibility
- 65% Customer-facing website/portals
- 65% Internal supply chain/procurement

SOURCE: The Yankee Group

Best Practices:

1

Coordinate SOA investments.

Each SOA project should be reviewed by a cross-functional team that has responsibility for setting and maintaining IT architecture standards. The team should make sure each SOA project can be integrated with the ones that come before it.

2

Make a business process map.

Inventory all enterprise services that support mission-critical operations and figure out how they relate to each other. "You probably won't get funded to do this," says Dwyer, "but it will become increasingly important with each SOA project." Having a map of existing enterprise services will ensure a company won't waste money on incompatible or duplicative projects, and make it easier to respond when a business model changes.

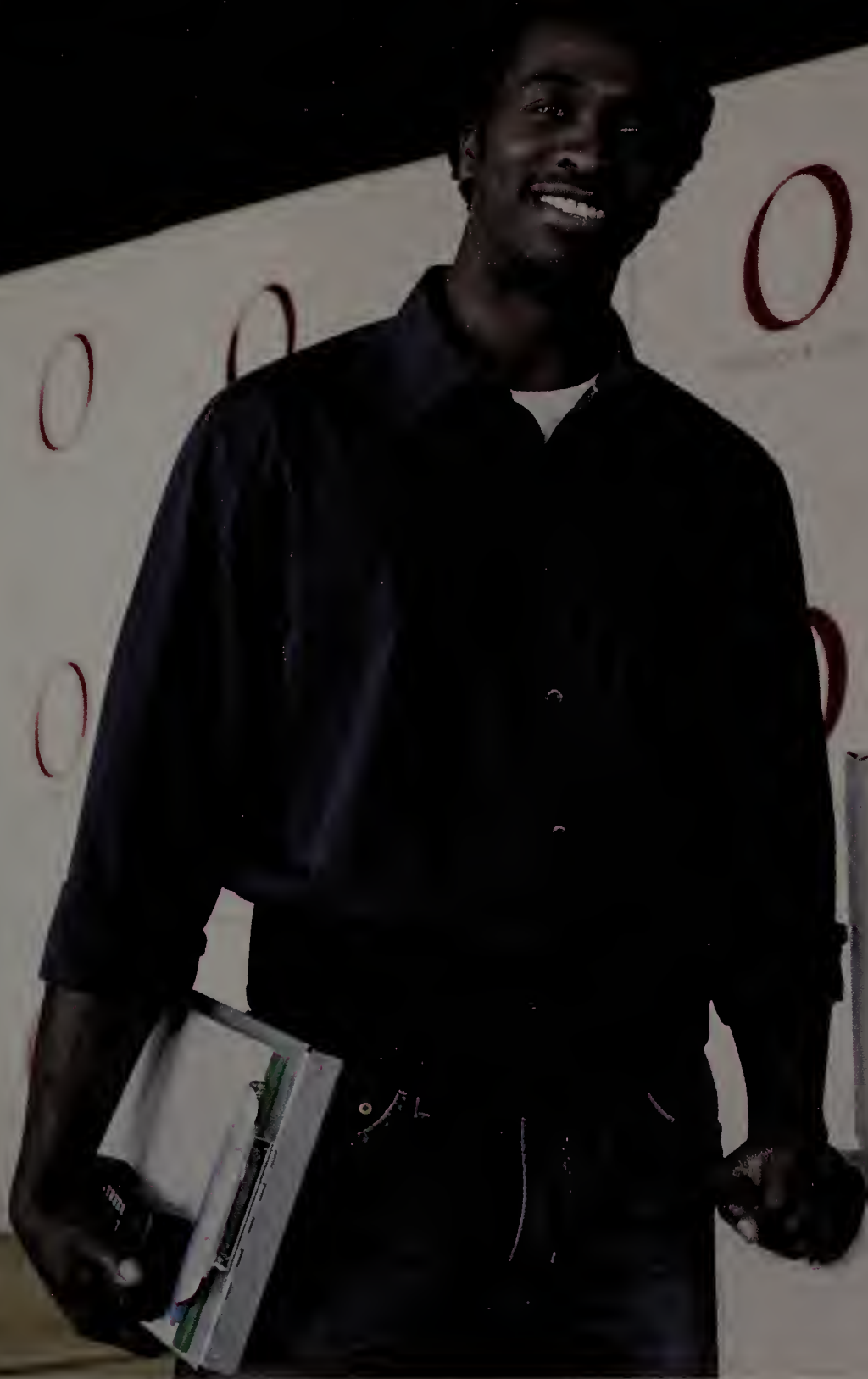
3

Define data. Create a set of data definitions that will be used to build SOA-based applications, such as what data is encompassed by the terms "order" or "account address." Definitions should be standardized throughout the company.

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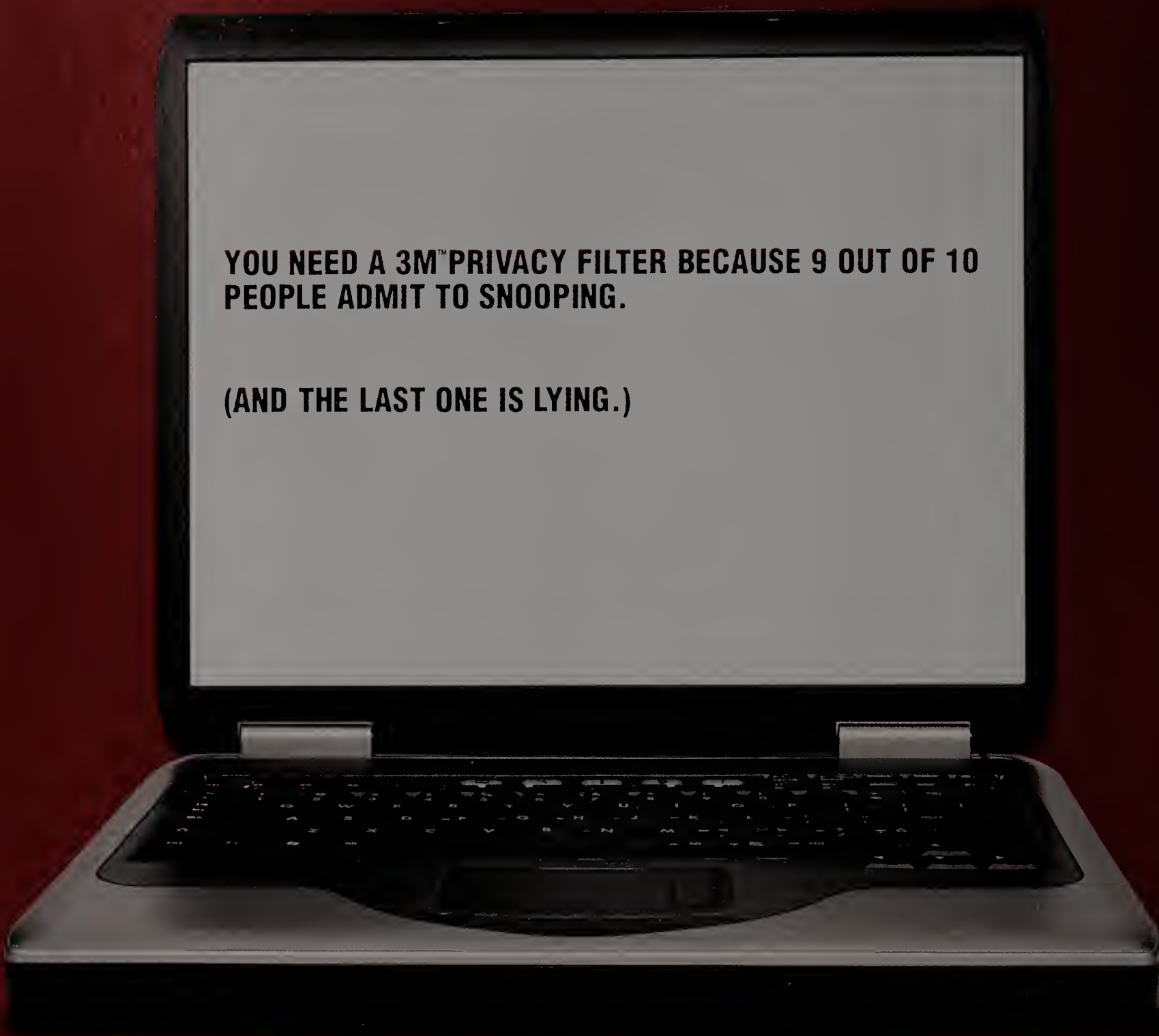
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Electronic data discovery tools help investigate fraud, breaches and other bad behavior. But CIOs should approach them with caution.

“CSI” for the Enterprise?

BY GALEN GRUMAN

SECURITY | Michael Osborne has been getting a lot of vendor calls lately pitching a new breed of products, typically called electronic data discovery (EDD) tools. These tools promise to investigate historical data to uncover security breaches, compliance failures and plain old errors in transactions across various enterprise systems, from network administration to accounting. Driven by compliance requirements such as Sarbanes-Oxley and the Health Insurance Portability and Accountability Act, these tools focus on user activities, such as who accessed a database or updated a customer account. The goal is to look at both real-time and historic patterns across multiple databases, networks and applications to find suspicious activities that might indicate insider financial fraud, customer identity theft, compliance policy breaches or theft of proprietary data such as customer contacts or product designs. As the senior security manager at Kimberly-Clark, which makes health and hygiene products, Osborne is interested in ways to prevent supplier or insider fraud, such as detecting sham providers used to steal or launder money. In other organizations, electronic data discovery tools might be used to detect identity theft or violations of information-access policies.

Continued on Page 30



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Osborne is not alone in getting these pitches, say analysts and consultants, who warn that CIOs should be cautious. "There's a lot of vaporware out there," says Avivah Litan, a security research director at Gartner. "You're seeing vendors build an industry around scare tactics over compliance and security."

That's not to say there aren't useful technologies available. For example, Osborne is evaluating a tool from Oversight Systems that analyzes accounting information from SAP and other financial systems to detect fraud and errors both in current transactions and in past transactions stored in the SAP system. He's recommended that Kimberly-Clark seriously consider adopting the technology.

At online shopping service provider 2Checkout.com, Tom Denman, the director of risk management, has adopted 41st Parameter's analysis tools to detect fraud in the shopping and financial transactions that his service handles for online stores. 2Checkout used to rely on real-time security event monitoring tools but found they couldn't do as thorough an analysis in real-time. Denman now batches customer transactions and uses 41st Parameter tools to analyze them against previous transactions and various fraud patterns, to detect stolen credit cards and the like (one fraud pattern might be the use of a credit card number for online purchases the same day in several countries). Suspect transactions get flagged for human review, prioritized by risk level.

monitor network activity for intrusions and viruses. EDD provides more context in which to find fraud or uncover breaches. "The tools can serve the understand-and-prevent function," says Keith Schwalm, vice president of Good Harbor Consulting, a security advisory firm. EDD tools can work as an adjunct to SEM tools, or provide both functions, notes Amrit Williams, a security research director at Gartner. The vendor trend is to merge the two functions into a suite, he adds.

Beware the Forensics Label

Many salespeople attach the label "forensics" to their security and compliance analysis tools, and that can be very misleading. In law enforcement circles, "forensics" means a well-defined set of discovery and investigative processes that hold up in court for civil or criminal proceedings. An enterprise that relies on these tools' records or analysis in, for example, a wrongful termination suit, is probably in for an unpleasant surprise. "It may not hold up in court," says Schwalm, a former Secret Service agent. "Very few vendors have an idea of what the requirements [are for proof, from a legal perspective]. They're really providing just a paper trail. You should challenge what the vendor means by 'forensics capability,'" he adds.

One gotcha of using EDD tools for legal purposes is proving the inviolability of the data. Tools that keep or aggregate event logs may not provide access control that lets the enterprise prove that the underly-

Many salespeople attach the label "forensics" to their security and compliance analysis tools, and that can be very misleading.

The use of historical data correlated across multiple systems and a focus on user activity is what distinguishes EDD from real-time security event monitoring (SEM) tools, which typically are used to

ing data is unaltered and accurate.

This issue is particularly critical because most vendors pitch their EDD tools as a way of detecting internal threats. Yet an insider is in the best position to access and

70%
of users
need
tools to
analyze
both
past and
real-time
events.

SOURCE: Gartner

alter data to cover his tracks or deflect blame to someone else, making truly secure access control and data management policies a must to even consider relying on EDD tools in a legal case. To thwart insider manipulations, critical functions such as setting up new vendors or changing payment destinations should require multiple levels of approval. "One person shouldn't be minding the whole store," says 2Checkout's Denman.

A related concern is being able to go back to the original raw data, since most EDD tools alter the original data to put it into a searchable database and to make formats from different types of monitoring appliances consistent. Such regularization is necessary to analyze the records, but to be legally effective, there must be a defensible way to show that it didn't distort the original data, says Gartner's Litan.

There are no broad standards for what constitutes acceptable forensics. Different courts and law enforcement agencies have their own standards, so the CIO should make sure his security experts consult with those organizations to find out what evidence they'll require to pursue a case. 2Checkout's Denman has done just that, working with the FBI's cybercrime task force "to know what they look for." For example, investigators prefer to make

Taking Data Protection to The Edge

Digital Data Protection Must Cover Today's Mobile, Extended Enterprises

In today's information-driven world, many businesses are working within the reality that data increasingly lies at the heart of their success. At the same time, the workforce has become more scattered, a fact driven home by the explosion of mobile workers. According to a study by IDC, the global mobile workforce is expected to grow to 878 million mobile workers by 2009. With that explosion has come a data migration, as business-critical data moves from the safety of the data center to local storage such as individual laptops, servers and PCs. Business leaders need to access, analyze and draw insights from their corporate data—all within a corporate environment that is increasingly driven by regulatory issues to closely track, monitor and protect business data regardless of where it lies inside—or outside—the workplace.

"Companies are realizing that there's a whole lot of data out there, and a lot of it is outside of data center control," says Kevin Roden, CIO of Iron Mountain. "That risk to a business is magnified exponentially with the changes in privacy regulations and requirements."

In this new world, it is increasingly obvious that CIOs must have more than a standard, centralized backup and recovery plan—they must build a strategy that protects data wherever it resides in an increasingly mobile world. The question is, how can they do so within the constraints of an IT infrastructure that may not be able to protect mobile data?

THE PROBLEM

At issue is a basic disconnect between how data is used and stored and how it is protected. Many disaster recovery and data backup plans are written for data centers, and completely neglect the data that resides elsewhere, such as remote office servers or laptops and PDAs. That translates to a huge business vulnerability, as much data—as high as



60 percent—is decentralized and lies outside of the centralized cone of safety. Such mobile data constitutes a huge risk factor. Tape backup methodologies outside the data center are largely undermanaged and unreliable. In fact, according to Gartner Group, more than 40 percent of such data is not properly backed up each night. Moreover, when those backups do occur, they are not conducted within the centralized control of IT, but rather by remote workers with little interest or expertise in backing up data.

"The problem is that remote offices rarely have the resources to manage data protection and security services," says Brian Babineau, an analyst at Enterprise Strategy Group in Milford, Mass. With such an unreliable plan in place, it's small wonder that *Storage* magazine estimates 77 percent of companies that conducted a backup audit also discovered bad tapes.

At the 2004 Gartner Data Center conference, 69 percent of attendees said they were unhappy with their current backup solution for remote servers, and with good reason.

The risk to data on mobile technology is even greater, as it



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represents a twofold danger. "Mobile workers are taking critical information out on the road with them, but it's challenging to protect that data and recover as needed," says Babineau. "On top of that, you have to figure out how to secure that data if somebody loses their laptop."

The business risks are huge, as failure to protect such a large quantity of business information puts both corporate reputation and revenue streams at risk. Many businesses cannot stand an extended disruption of business, yet they continue to take daily risks with the safety of their data, through either outright neglect or overburdening an IT staff with tasks that take them away from their core mission to add business value through innovative technology implementations. The end result is sobering: a company that is vulnerable to disaster, fraud, exposure and potentially disastrous errors.

THE SOLUTION

Smart CIOs realize that a standard, centralized backup plan is no longer sufficient. Rather, they must build a strategy to protect data that increasingly resides at the edge of the network in an enterprise, rather than in a centralized data center.

"We're seeing the more forward-thinking companies and people who understand the value of information on the edge of the network, and are starting to build a strategy to address it," says Roden.

Roden recommends the following as vital to success:

MOBILE WORKFORCE PROTECTION. Here, CIOs should look for reliable, secure and automatic backup and recovery services that offer a breadth of options and choices. Web-based access and centralized control are vital. Look for the ability to access and manage media, control authorization levels, and initiate physical security on a laptop as well. The key is to automate here—users cannot be relied on to secure and protect their data and mobile devices. A service such as DataDefense™ is key. DataDefense™ provides automatic, intelligent encryption of all sensitive PC data, without requiring any special action by the end user and regardless of whether a system is online or offline. When a system is reported lost or stolen – or DataDefense™ detects behaviors that are inconsistent with authorized use – sensitive data is automatically eliminated and the PC is disabled. "The approach is to take as much uncertainty out of the equation as possible," says Roden. "It's important to make sure that accountability lies with the data protection solution, not the users."

REMOTE OFFICE PROTECTION. CIOs need coverage all the way to the network's edge, including data on distributed and remote servers, without the risks and failures inherent in tape backup products. By choosing reliable integrated backup, offsite data protection and recovery services, CIOs can build a strategy that encompasses each piece of the data protection puzzle without

DISTRIBUTED DATA PROTECTION

The amount of data decentralized outside the centralized cone of safety

878 MILLION

The number of mobile workers by 2009, according to IDC

40%

Percentage of distributed data not properly backed up each night

69%

Percentage of attendees At 2004 Gartner Data Center conference unhappy with current backup solution for remote servers

77%

Percentage of bad tapes discovered by companies who tested their backup systems – *Storage Magazine*

having to build a fragmented layer of services. The best solutions also reduce the overall TCO of data protection by reducing tape handling and maintenance costs and risks while simultaneously lifting workload from the IT staff. "If you're a bank, you want your best IT minds thinking about applying IT to financial services, not backing up data," says Roden. "You need to look for solutions that are automatic and reliable, and require no human intervention."

ENHANCED BUSINESS VALUE. Data protection strategies must also maximize the business value of corporate data by providing timely recovery and assuring business continuity. Arriving at acceptable recovery levels means that CIOs must weigh business risk versus recovery costs, so it's important to be able to access an array of service offerings that can be chosen to match differing levels of business data. "Having choices from a service provider to deliver various RPOs (Recovery Point Objectives) and RTOs (Recovery Time Objectives) is crucial, because not all data is equal, and not all of it should be protected equally," says Babineau.

In the final analysis, CIOs must make a choice: Do they care enough to protect and secure data at the edge? And if so, how do they do it?

"You can shell out a ton of budget dollars on tape drives and backup software for PCs, along with the labor involved in managing the backup and convincing employees that it's important," says Babineau. "The alternative is to use a solution that takes the responsibility, and does all that for you automatically." ▲



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Warren McFarlan, Professor
Emeritus, Harvard Business
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CIOs have unique
challenges balancing the
demands of the business
with the capabilities of
technology. The CIOs must
be both a corporate and
an IT leader. McFarlan also
talks with a CEO about the
criteria for measuring a
CIO's leadership ability.

Closing Address: Leadership & Ethics— Defining Moments

Joseph L. Badaracco,
Author and Professor of
Business Ethics, Harvard
Business School

"Defining moments" occur
when work choices and life
choices become one.
Badaracco examines the
right-versus-right conflicts
that every leader faces and
presents an unorthodox
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to think about and resolve
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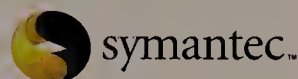
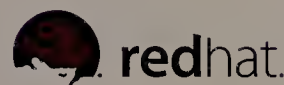
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CIOs should be sure they don't approach EDD solely as an IT issue. "Let your general counsel manage this," advises Matt Curtin, founder of the forensic computing consultancy Interhack. An attorney can best decide what records would be needed for legal proceedings. And he can set guidelines on cleansing transaction histories: "The longer you keep the data, the more you have to be subpoenaed," Curtin says, "so you'll be hit for more [discovery] requests." That increases the chances that the other party will find your own errors and mistakes, he notes.

Focus on Investigation

While the "forensics" label may be misleading, EDD tools can help the enterprise investigate possible security and compliance breaches to identify where a true forensics investigation should take place or to understand a previous breach as part of an effort to strengthen enterprise defenses.

Curtin advises that enterprises consider EDD tools that provide search and query capabilities that in-house analysts can use to uncover clues about potential problems, not just canned detection rules. Having lots of monitoring systems isn't that useful if you don't know where to focus your attentions. EDD tools can help identify the problematic areas, "so you don't bother with the rest of the data," he says. But systems that offer only canned analyses don't let forensics experts do the kind of digging they need to do, forcing them to go through logs and databases manually. "Most companies today run the rules that come out of the box," notes John Summers, global director of managed security at the Unisys consultancy, but for EDD tools to be effective, "rules need to be specific to your business and processes." Good EDD analysis

tools let you both customize the rules and conduct your own queries and searches, Curtin and Summers say.

It's also key to remember that current real-time analysis tools focus on a specific type of monitoring, such as credit card fraud detection or intrusion detection, rather than provide broad, enterprisewide risk analysis.

Monitor at Multiple Levels

Vendors are increasingly focused on EDD as a way to get CIOs' compliance money, says Unisys's Summers. Early EDD tools just added reporting to the real-time event-monitoring capabilities offered by security event management (SEM) tools and appliances, he notes, but since summer 2005,

IT, business, security and legal needs. To accomplish that strategy, the CIO needs to ensure that monitoring and analysis is deployed holistically, not by just the security team or the network administration staff. Effective fraud and compliance monitoring requires having the right policies in place to manage data and access, as well as analyzing ongoing events in the network, in key applications and in key data stores.

The new breed of EDD tools are fairly expensive and difficult to deploy, notes Gartner's Williams. Costs for a large enterprise start at \$300,000 and can rise beyond \$1 million to deploy, since storage needs can be multiple terabytes and require an information management system. The actual

Having lots of monitoring systems isn't that useful if you don't know where to focus your attentions.

vendors have been adding more "pragmatic" compliance-oriented services to the tools now relabeled as EDD. For example, tools that used to focus on firewall and intrusion detection logs are now examining database logs to monitor access to specific data, both to help assess compliance with data access policies and to identify data access patterns that may indicate fraud. By noticing a firewall breach that occurs 30 seconds before unusual database access, for instance, such tools can alert administrators of a possible identity theft. That might lead to an immediate shutdown of access to that database as well as a deeper look into past activities to see if the identity theft has been ongoing. Similarly, EDD tools are also now examining server logs for both compliance and security analysis, he says.

To do truly useful monitoring and analysis of data access requires understanding who the users are and what permissions they have, Summers says, so he expects EDD tools to begin monitoring policy servers and directory services in the next year. That requires a cohesive strategy for compliance and security, one that requires coordinating

deployment can take up to six months if it involves custom development, which is often the case. Over time, the tools will become more standardized and thus easier to deploy as vendors see broad patterns from the custom deployments, Williams notes. But today, the high costs have limited the tools' adoption mainly to regulated enterprises or ones where fraud costs more than its prevention, he says. For more on the different EDD tools that are available, go to www.cio.com/041506.

EDD tools can be part of an overall security and compliance effort, but by themselves, EDD tools are barely Band-Aids—unless, of course, you're just making a pro forma, "cover-your-ass investment," says Gartner's Litan. That kind of lip-service monitoring and analysis may help you complete a checklist to impress naive shareholders, but it won't really help your company, says Good Harbor's Schwalm. After all, as Summers of Unisys notes, "most companies already do logs, but no one looks at them." **CIO**

Galen Gruman, principal of the Zango Group and a regular contributor to *CIO*, can be reached at ggruman@zangogroup.com.

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Toxic!

Some leaders are so bad, they can poison a company. Here's how to spot them, and what you can do about them.



Working for some leaders is as painful as taking a full dose of poison. Their behavior is so bad it is toxic to their organizations. You know the type: More of a despot than a leader, he pits employees against each other and paralyzes the organization with fear.

Sometime during your career you may have encountered such a toxic leader, or maybe you see signs now of one emerging in your company (hopefully you aren't one yourself). Here's how to spot one, how to protect yourself and your team from his venom, and how to nip an emerging toxic leader in the bud.

The Markings of a Toxic Boss

Toxic leaders share some common traits. They often have a rigid commitment to an idealized goal. They view challenges to their vision as akin to treason. Either you're with such a leader, unquestioningly, 100 percent, or you're the enemy.

The poisonous leader is arrogant; in her mind, she is always right, and she takes input only from a limited group of yes-men and -women. Her chosen few get information, but no one else does, and so there is no discussion about the work being done.

Retribution from such a leader is swift for those not aggressively supportive of his decisions. He treats employees coldly, even cruelly. He assigns blame without regard to responsibility, and takes all the credit for himself. I once had such a boss, and he gave me a new definition of shared risk: If something I did was successful, he took the credit. If it wasn't, I got the blame. Painful as this was, I learned a lot during his short tenure. He was my first negative role model. Fortunately, I was able to move on, and he left the company.

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Why leaders behave this way is the subject of much speculation. Some people attribute it to greed, not just for money but for power or recognition. Incompetence can also drive the toxic leader's behavior, as his fear of being "found out" influences his interactions with others.

The Toll of Venomous Leadership

Poisonous leaders sap the strength of their organizations. Their demand for loyalty causes employees to fear whether they are doing something the leader will deem to be wrong. In this demoralizing and dehumanizing atmosphere, the toxic leader may drive the organization into paralysis. Employees will stop thinking creatively; their productivity will decline, and they will miss their goals. In extreme cases, employees desperate to please their leader and keep their jobs will slide into unethical behavior or outright corruption.

One might question why such behavior is tolerated. First, it is not uncommon for toxic traits to be hidden behind a mask of charisma. Toxic leaders are actors, playing a role to achieve their self-styled goal. Second, in many companies business success tends to overshadow personal weaknesses.

In one organization where I worked, a senior executive consistently bullied his employees, yet he was charming to those above him. Even after his superiors witnessed the behavior, nothing was done about it because he always delivered his profit goals. Only after his staff turned over significantly and he missed his goals did he face any consequences. He wasn't fired. Instead, he worked with a coach and changed his leadership approach dramatically. This outcome suggests that an organization risks encouraging toxic leadership by rewarding results and ignoring how they were achieved.

A Survival Guide

If you're faced with a toxic leader (whether or not he's your boss), you can survive. But you will need a strategy to do so.

First, you have to decide whether to stay or leave. Your personal circumstances may require you to stay. If leaders are rotated frequently in your company, you could wait out the poison leader's tenure. Or your own skills and reputation may be strong enough so that you're not damaged by the abuse you get.

Once you decide to stay, you will need to decide whether to confront the behavior or lay low. Trying to counsel the boss is likely to work only if you're already in the inner circle, and only if he decides to listen to you instead of cutting you off from the group. Joining with others to confront him carries similar risks. Only you can decide how far to go. If you decide to take on the leader, make sure you have all the relevant facts, pick an appropriate time and place for the confrontation, and have a plan for bringing the issues forward.

Meanwhile, you can find support from other executives in the organization by strengthening those relationships. Take steps to establish your independence. Never defend the ruth-

If you have a toxic leader emerging in your organization, you can turn him on a different path.

less behaviors. Outside of work, find uplifting activities to nurture your self-esteem.

Whatever you do, buffer your people from the toxic leader. Defend them against any hits that come from above. I once saw a manager sit quietly and allow a member of his staff to be pummeled by abusive questioning during a presentation. How cowardly was this manager that he couldn't step in and deflect the criticism? Fear of retribution may tempt you to duck this responsibility, but good leaders do not abandon their people. Let integrity and courage lead you to the honorable thing.

Detoxifying the Next Generation

Toxic leaders aren't born, they're shaped by their experiences. If you have one emerging in your organization, you can turn him on a different path. You can recognize an emerging toxic leader by these signs:

- **Self-centeredness.** An employee is willing to harm others in order to come out on top.
- **Messianic visions.** The employee's vision seems impossible to achieve, or she positions misguided actions as attempts to achieve a noble cause, and she won't take advice.
- **Arrogance.** He displays disdain for others.
- **Blame-shifting.** I saw one executive order a "take no prisoners" approach to setting and enforcing a technology standard, then disavow the "noncollegial" style of his employee, leaving her to repair her reputation alone.

Redirect these rising leaders by making your expectations for behavior clear to everyone in your organization. Investigate low morale, and attack its causes. Ensure that performance reviews document toxic behavior, and make sure offenders know that mistreating others is going to short-circuit their careers. Promote and recognize those leaders who demonstrate nontoxic behaviors.

Finally, set an example. Most leaders are neither good nor bad always, in all things. Recognize your weaknesses and work on eliminating them. Be someone who is able to take advice. Demonstrate integrity. Work unfailingly for the benefit of your team. Toxic leaders' victories are often short-lived. Avoiding and defending against toxic behaviors should lead you, and those who follow you, down the path to sustained success. **CIO**

Before retiring in 1999, Patricia Wallington was corporate vice president and CIO at Xerox. She is now president of CIO Associates in Sarasota, Fla. Send feedback to leadership@cio.com.



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The Value Inside

CIOs should be treating success with an application as an invitation to see what else the software can do for their business



Success can be a trickster; be wary. While I was moderating a customer advisory board workshop for the software division of a giant technology company, a disturbing observation dawned on everyone in our poorly air-conditioned conference room: The software we were all there to improve could do much more than even its most loyal users dreamed of, yet that extra capability was almost never tapped.

The division's leadership heard story after story of how their software did a terrific job of solving one problem, yet was never considered as a possible solution for any other business problem. Somehow, the software's early success had branded it a useful "point solution" rather than an innovative platform for an array of apps. For example, while the software was superb for both mass and custom distribution of e-mails and PDFs, it could also handle global distribution of richer media formats—streaming, for instance. But clients were not even aware of the greater capability. In fact, this server software, with minor modifications, was explicitly designed to deal with the bulk of the business and technical issues its users had deemed critical.

Why did early success blunt enhanced adoption? Communication was part of the problem. People just didn't see the links between digital formats, and the vendor didn't know enough about its customers' specific business needs to point out how the software could address them. While it was true the software would have to be tweaked to custom-support specific needs, the vendor actually had tools that made customization cheap and easy. But again, the customers didn't understand what was available.

Bottom line? The software was a victim of its early success.

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The customers clearly liked it—why else join the advisory board?—but the package was woefully undervalued and underutilized. The point solution perception actually undermined its potential as an enterprise business process platform. Oh, the irony! The software had been unfairly “niched.”

At a major software company's CIO conference barely a month later, it was déjà vu all over again. Fortune 1000 IT leaders took turns telling their host's senior management that the vendor's enterprise software was underutilized. Business process owners and line executives inside their companies kept looking for alternate software solutions to business needs when the vendor's existing software could accomplish most everything required—and more.

“You need to make it easier for us to utilize all the software we license from you,” one CIO told the vendor hosting the conference. “Otherwise, our people are just going to go out and buy the software they think they need from someone else.”

Indeed, the common theme of these vignettes turns out to be a problem throughout enterprise computing. Organizations in general—and IT in particular—are underachievers in extracting full value from the systems they acquire and deploy. They're too satisfied with initial success. For confirmation, you have to

look only as far as your own desktop. The overwhelming majority of people use a fraction of the power and potential of, say, Microsoft Office or Google. Survey after survey reveals that managers typically use less than 15 percent of the func-

tionality of PowerPoint or Excel. A recent IT survey by a Fortune 50 company showed that not even 10 percent of the employees over the age of 35 used the corporate e-mail filtering function.

How Vendors Discourage Experimentation

Now ask yourself, What portion of our “application backlogs” are a function not of unwritten code but of unused or undeployed software features and functionality that are simply unknown or untaught to users? My bet? At least half, probably more.

Why do I so confidently assert this? Because I've seen it with my own eyes. Fifteen years ago, everyone in the industry joked about the unfulfilled promises of overhyped “vaporware.” Today, there is not a major enterprise software package—or a desktop app (Web-based or not)—that doesn't have far more features and functionality than 75 percent of its users need. Are there vendors who fail to deliver? Of course, and there always will be. But the reality is, for most organizations, a greater variety of “off-the-shelf” choices with more built-in functionality exists than ever before.

Yes, there will always be circumstances that require

workarounds and custom-coding and special subroutines and so on. However, too many IT groups (and their internal customers) haven't thought through how they can tap existing software portfolios to better meet business needs.

Now I'm the first to acknowledge that many vendors—you know who they are, they know who they are—have stupid, counterproductive licensing policies that discourage willing customers from getting greater value. Shame on them! But when

Organizations in general—and IT in particular—are underachievers in extracting full value from the systems they acquire.

you look at the rate of open-source evolution and how once-simple servers that handle transactions are becoming more multidimensional, savvy CIOs have to ask: How well do we really know what our software and systems are capable of doing if we're really prepared to be clever about them? Are we adequately building on success?

CIOs need to audit the early wins and encourage people to use them as springboards. The implementation challenge shifts when we think less about reaching for something “new” to solve problems than rethinking how we should tap what we possess. Yes, many vendors do a lousy job of documenting or explaining their offerings. And sometimes it's easier to look for another point solution to solve a new problem.

But if we've already learned to run a package that cost-effectively delivers the goods, why not build on it if the price is right? Building on the right experiences is better economics than acquiring novelties that will inevitably pose their own unique challenges anyway.

Sitting in that airless room with a genuinely committed vendor and genuinely committed customers reinforced a simple but hard-won truth: Build on what works, and treat early success as an invitation to innovate—not as a sign that the problem has been solved. Vendors need to push their sales and support people to explain how usage can evolve over time, not just how best to solve the problem du jour. And CIOs need to do a better job of reaching out to their business units and working with them to help identify the features and functionality they need, and then unlock those features from the software they already own or lease.

The true test of our stewardship is not just how well software is used but whether we're getting the full value that we should. That's not just a technology leadership test; it's a business leadership challenge. **CIO**

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Is an attitude of complacency obvious in your company? And if so, what are you doing about it? Share your hard-earned wisdom with Michael Schrage. Find the comments box on the online version of this article. Go to www.cio.com/041505.

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After the Storm

Even though this Mississippi-based CIO lost everything in Hurricane Katrina, the disaster gave her a newfound appreciation for the coworkers who rallied around her

BY JAN RIDEOUT



I loved living on the Mississippi coast. I arrived in December 2001 to be CIO for a \$3 billion division of Northrop Grumman, which builds military warships in Pascagoula, Miss., and New Orleans. As a native New Yorker and having just moved to Mississippi from Northern California, I thought this would be just another stop in my career.

I was wrong.

After living on the Mississippi coast for about a year, I told my boss (and everyone else who asked) that I never wanted to move again. I had found a great job in a small-town atmosphere devoid of traffic and pollution. And my home was directly on the back bay of Biloxi, Miss., with incredible views of the water and wildlife all around. Paradise found!

But all of that changed on Aug. 29, 2005, with the arrival of Hurricane Katrina. On the Saturday evening before the storm hit, my husband, David, and I discussed evacuation plans. Having driven 10 hours to Tennessee (with our three dogs in the pickup truck) just six weeks before to escape Hurricane Dennis, we were both reluctant to do the journey again.

We considered staying at a local motel, but when we awoke on Sunday morning, Aug. 28, the storm was looking too dire for us to remain in the area. I went online and found a hotel in Bainbridge, in Southwestern Georgia, that would take our dogs. By 11 a.m. we were fighting the traffic driving east.

My staff had spent Friday and Saturday doing their usual heavy-weather preparation. I have about 230 people in Mississippi and Louisiana, and they've been through the drill many times before: taking backups, sending them to one of our data centers in Dallas, shutting down servers, covering them



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Monday, Aug. 29, was an extremely long day—sitting in our tiny motel room, watching CNN and the Weather Channel to get a sense of how bad the storm was. My BlackBerry had no signal in Bainbridge, so I couldn't contact anyone either by phone or e-mail. When we saw our hometown Comfort Inn (which was where we originally planned to stay) with part of its roof blown off, we knew it was going to be bad. We just had no idea how bad.

The Damage Done

By Tuesday afternoon, I was on a plane along with David to Dallas, where my boss, Northrop Grumman CIO Tom Shelman, is located. After settling in to our new "hometel," I dashed into our Dallas office to join the efforts to set up an IT command center. The Pascagoula center was flooded; it had an eight-foot watermark in the building. The New Orleans data center, while intact and on generator power, was disconnected from the rest of world due to extensive problems with the public infrastructure. In addition, millions of dollars of information technology infrastructure—networks, phones and desktops out in the Pascagoula shipyard—had been destroyed.

My Northrop Grumman colleagues were struggling to find key members of my staff. Finally, late Tuesday, I was able to get a call through to one of my immediate staff who lived near me. He had been evacuated from his home early Monday morning before the water rose too high and was in a local shelter. Talking to him brought the reality of my situation home. He informed me, as gently as possible, that it was very likely that the area I lived in was completely destroyed. I sank to the floor in despair. If what he was saying was true, I had just lost everything I owned.

The next day, my husband, who also works for Northrop Grumman, boarded one of the company's many corporate planes bringing supplies and equipment to the region. He was met by one of my employees who was generous enough to drive him to our house. Prior to his arrival, another one of my staff had made his way over to our home and finally got through to me on his cell phone.

"Tell your husband not to come," he said. "There's nothing here."

I took the day off to absorb the shock. I knew I had to take some time to grieve. I took the opportunity to get a few decent outfits, as all I had taken when I left Mississippi was a pair of jeans, some sweats and a pair of Birkenstocks. My entire wardrobe was now in the Gulf of Mexico.

Picking Up the Pieces

Gradually, we began to make contact with other staff members

in the area. But what we found was that we had to take care of their basic needs, such as food, water and gasoline, in order to get them in a position where they could help. Volunteers from Dallas drove RVs loaded with supplies down to the coast.

My own basic needs focused on finding a place to live. After being stationed with Dave and the dogs in Dallas for two weeks, we drove back to Mississippi. We moved into one of the travel trailers Northrop Grumman had sent down to house employees. Finding a house to rent was extremely difficult. Any undamaged housing in the area was snatched up sight unseen. After two weeks of relentless searching, we finally found a rental in Mobile, Ala.

In the meantime, IT employees from Texas, Florida, Maryland, California and several other locations joined forces with the local Mississippi and Louisiana staff to help pull off a miracle. Two weeks after Katrina hit, the shipyard in Pascagoula reopened and we had basic systems, such as the system for employees to clock in and out, ready and working.

Approximately six weeks after the storm, 95 percent of the

Every day, I miss my home, the gorgeous sunsets and the pelicans flying by.

application systems had been restored. People who had lost everything continued to make the restoration of the shipyard systems a priority. In Pascagoula, nearly the entire IT staff showed up for work almost every day. One of my direct reports stayed in her home for the storm, and when her windows started breaking and the waters began to rise, she and her family had to swim to safety. They spent five hours in the flood waters. But she had put her BlackBerry in a Ziploc bag. She stayed in contact and showed up for work the next day. I am forever grateful to all the colleagues who rallied around me in this time of difficulty.

It's now almost eight months since the hurricane, and we are still rebuilding some of the shipyard's IT infrastructure. The contents of my home still lie strewn on my property. We understand it will likely be years before we can even start to rebuild.

Every day, I miss my home, the gorgeous sunsets and the pelicans flying by. I miss my "things": my furniture, my clothes and my jewelry. But perhaps as compensation, I have a newfound appreciation for other things. I've come to realize that the friendship, support and love of my coworkers is a gift I will never again take for granted. **CIO**

Jan Rideout (jan.rideout@ngc.com) is CIO of the Ship Systems Sector at Northrop Grumman. Please send comments to Executive Editor Alison Bass at abass@cio.com.



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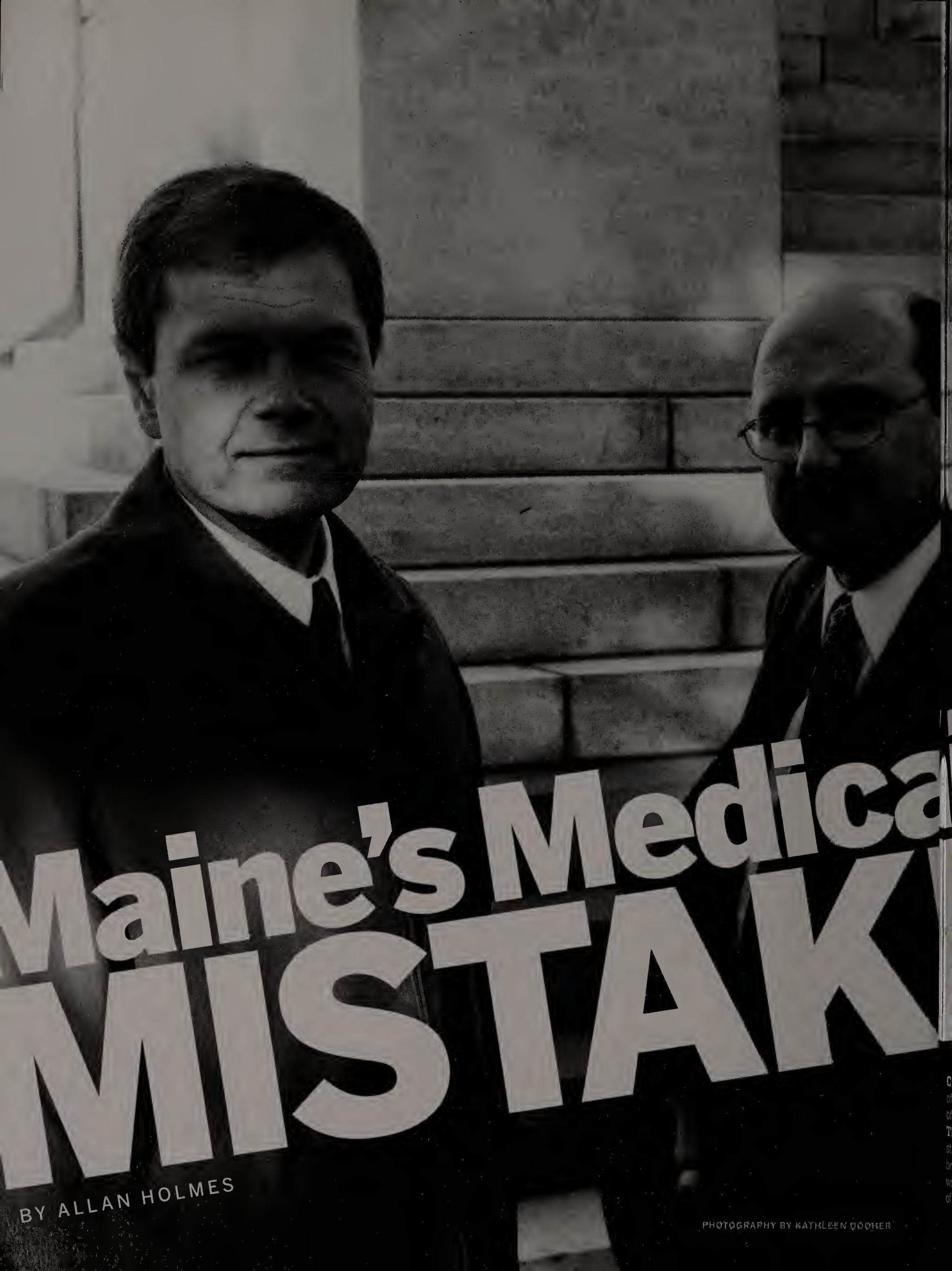
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Maine's Medical MISTAKE

BY ALLAN HOLMES

PHOTOGRAPHY BY KATHLEEN DOOHER



Maine's attempt to build a new Medicaid claims processing system is a classic example of how *not* to run a massive project

On Friday, Jan. 21, 2005,

the state of Maine cut the ribbon on its new, Web-based Maine Medicaid Claims System for processing \$1.5 billion in annual Medicaid claims and payments. The new \$25 million program, which replaced the state's old Honeywell mainframe, was hailed as a more secure system that would clear claims faster, track costs better and give providers more accurate information on claims status.

But within days of turning on the new system, Craig Hitchings knew that something was seriously wrong.

There had been problems right from the start—an unusually high rate of rejected claims—but Hitchings, director of information technology for the state of Maine's Department of Human Services (DHS), had assumed they were caused by providers using the wrong codes on the new electronic claim forms. By the end of the month, he wasn't so sure. The department's Bureau of Medical Services, which runs the Medicaid program, was being deluged with hundreds of calls from doctors, dentists, hospitals, health clinics and nursing homes, angry because their claims were not being paid. The new system had placed most of the rejected claims in a "suspended" file for forms that contained errors.

Tens of thousands of claims representing millions of dollars were being left in limbo.

Hitchings' team—about 15 IT staffers and

Reader ROI

- ⌘ The importance of having a contingency plan
- ⌘ The consequences of skipping end-to-end testing
- ⌘ 10 rules for successful project management

Craig Hitchings (left), director of IT for Maine's Department of Human Services, and **Dick Thompson**, now CIO for the state, gambled that building a brand-new Web services system would improve the processing of Medicaid claims.

10 Steps to a Successful Project

about 4 dozen employees from CNSI, the contractor hired to develop the system—were working 12-hour days, writing software fixes and performing adjustments so fast that Hitchings knew that key project management guidelines were beginning to fall by the wayside. And nothing seemed to help.

Day after day, the calls kept coming. The bureau's call center was so backed up that many providers could not get through. And when they did, they had to wait on the phone for a half hour to speak to a human.

By the end of March, the number of Medicaid claims in the suspended bin had reached approximately 300,000, and the state was falling further and further behind in its ability to process them. With their bills unpaid, some of Maine's 262,000 Medicaid recipients were turned away from their doctors' offices, according to the Maine Medical Association. Several dentists and therapists were forced to close their doors, and some physicians had to take out loans to stay afloat. With the Medicaid program accounting for one-third of the entire state budget, Maine's finances were in shambles, threatening the state's financial stability and its credit rating. Yet Hitchings was at a loss to explain what was causing all the suspensions.

And every day brought hundreds more.

Today, more than a year later, it's fair to say that the Maine Medicaid Claims System project has been a disaster of major proportions. Since the new system went live, it has cost the state of Maine close to \$30 million. The fallout has been broad and deep. In December 2005, Jack Nicholas, the commissioner of the DHS who oversaw the project, resigned.

As of press time, Maine is the only state in the union not in compliance with the Health Insurance Portability and Accountability Act of 1996 (HIPAA)—a striking irony given that the new system was designed to facilitate that compliance. Although federal authorities have said they will work with the state in extending the deadline, the failure has been a black eye on Maine's ability to manage the health of hundreds of thousands of its residents. And it has become an issue in this year's race for governor.

State IT officials say they have fixed most of the bugs in the new Web services system and that it is now processing 85 percent of claims (although physician groups dispute this). With 20/20 hindsight, they can now look back and see where the project went wrong. Hiring a vendor, CNSI, that had no experience in developing Medicaid claims systems was the first mistake. And that was compounded by the decision to build a new and relatively unproven

1. Scope out a detailed plan. Describe what the system must do for users and how you will measure the performance of the system and its output.

2. Watch out for bad RFP bids. A low number of bids or bids that are not within an acceptable range suggest that the requirements have not been properly communicated or are unrealistic.

3. Plan ahead. Line up subject matter experts who know the business processes for the new system and can provide guidance to developers and programmers during buildout. Assign a business expert full-time, or nearly full-time, to the implementation. Create a steering committee that includes subject matter experts and developers, and meet frequently.

4. Find the bottleneck. You can develop a system only as fast as it takes to build the most complicated component. Many times the delay is not from writing code, but rather something else, such as finding time with a subject matter expert. So, resist hiring more programmers to speed up the development process until you analyze what is slowing down the project and focus resources there.

5. Do not cut corners on testing. The last thing you want to do is ignore critical pilot tests and end-to-end tests. Ultimately, such corner-cutting will result in longer delays later. If you need more time, ask for it, and defend why you need it.

6. Develop a backup system. If replacing a legacy system, make sure the users can fall back to the old system if the new system fails and needs to be reworked.

7. Prepare other contingency plans. As part of your backup plan, be prepared to communicate with system users so that they can use the backup system and know what is expected of them.

8. Train, train and train. Provide frequent training for internal staff on new business processes and system requirements, including what must be done in case of a system failure. Train call center staff on how to manage users' questions. Train users on how to use the system and what they should do in case of failure.

9. Honesty is your best policy. In case of failure, provide honest answers to users and staff. Do not make promises that you do not know you can keep.

10. Triage fixes. In fixing a flawed system, prioritize fixing those requirements that have the biggest impact on users and that provide basic, needed functionality. Come back to the bells and whistles later.

—A.H.

technology platform for the entire system rather than, as other states have done, integrating a Web-based portal with back-end legacy systems. Thirdly, IT switched over to the new system overnight with no backup system in case something went wrong. And making matters worse, no end-to-end testing or training was conducted before the switch over. Indeed, the story of the Maine Medicaid Claims System is a classic example of how *not* to develop, deploy and manage an advanced Web services system.

"By the first of March, it was clear that we were missing any sort of basic management of this project and were in complete defensive mode," recalls Dick Thompson, then head of procurement for the state of Maine and now its CIO.

"We could not see our way out of this."

Out with the Old

In the late 1990s, states were moving fast to overhaul their Medicaid claims processing systems. Driving the transformation was HIPAA, which required numerous changes in managing patient health and records, the most significant of which was protecting patient privacy. Maine, like other states, had to upgrade its systems to better secure Medicaid patient records. Under HIPAA, the state had until Oct. 1, 2002, to have a system in place that would secure and limit access to that information.

At the same time, the federal Medicaid program was becoming more complex. As additional health services were added, the number of codes and subcodes for services grew, and payments to doctors and hospitals were parsed accordingly. Maine also needed to give providers a way to check the eligibility of Medicaid patients and the status of their claims. Making this information available online, they hoped, would cut down on the number of calls to the state Bureau of Medical Services, thereby saving the state money.

State officials knew that upgrading the old system would be a

Herculean task. Maine processes more than 120,000 Medicaid claims per week, and the existing claims processing system—a 1970s vintage Honeywell mainframe—was not up to the job, nor could it meet HIPAA's demands or provide online access. The state's IT managers reasoned that a new end-to-end system would be easier and cheaper to maintain. (Other states reached different conclusions. Massachusetts, for example, decided to build a new front-end Web portal for providers and Medicaid patients that could be integrated with the state's existing legacy systems. For more on this, read "Opening a Virtual Gateway to Better Health," online at www.cio.com/031506.)

The development of the new system was assigned to the IT staff in the DHS, which decided it wanted a system built on a rules-based engine so that as Medicaid rules changed, the changes could be programmed easily into the system.

Some service providers, such as EDS, offered states the opportunity to outsource claims processing systems. But the DHS staff believed building its own system would give it more flexibility. The

staff also believed it could manage the system better than an outsourcer. "We had a track record of running the old system for 25 years," Thompson explains.

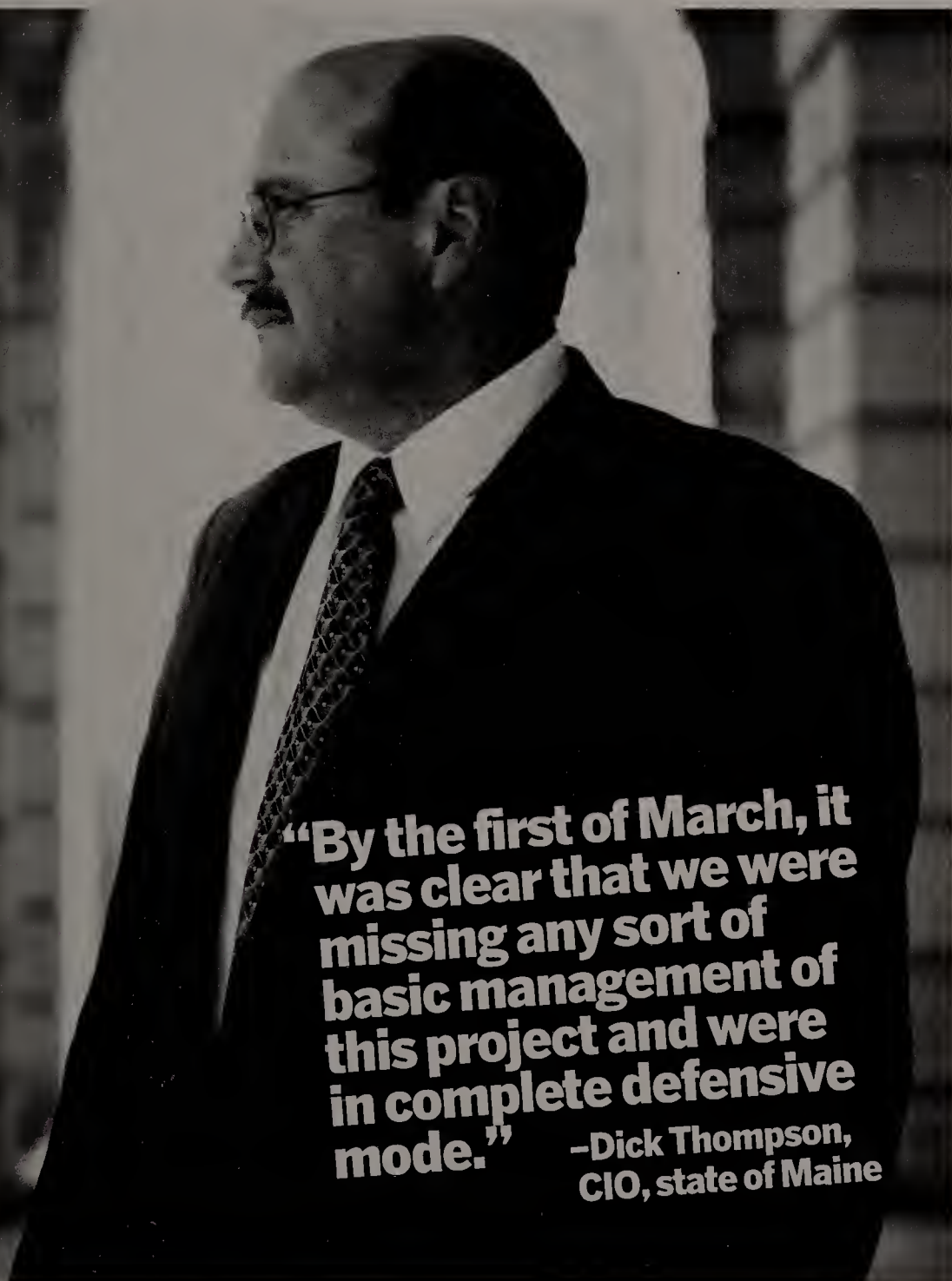
In April 2001, the state of Maine issued an RFP for the new system. But by the end of the year, the state had received only two proposals: one from Keane (for \$30 million) and another from CNSI (for \$15 million).

Typically, agencies like to see several bids within a close range. That way, procurement officials are confident that the requirements are doable and the bids realistic. In this case, the low bidder, CNSI, had no experience in building Medicaid claims processing systems. In contrast, Keane had some experience in developing Medicaid systems, and the company had worked on the Maine system for Medicaid eligibility.

The paucity of bidders and the 100 percent difference in price between the two bids should have been red flags, says J. Davidson Frame, dean of the University of Management and Technology in Arlington, Va. "Only two bidders is a dangerous sign," he says, adding that the low response rate indicated that potential bidders knew the requirements of the RFP were unreasonable. "Thompson should have realized immediately something was wrong with the solicitation, and redone it," Frame says. "Even if they missed the [HIPAA] deadline, it would have saved time and money in the long run."

The Seeds of Failure

CNSI proposed building the new system with J2EE software language, arguing that it was needed to get the scalability state officials were asking for, according to Hitchings. J2EE is a powerful programming language, the Ferrari of software code, which some of the largest corporations are now using to run their global opera-



"By the first of March, it was clear that we were missing any sort of basic management of this project and were in complete defensive mode."

**—Dick Thompson,
CIO, state of Maine**

tions. Experts say deploying such advanced technology, especially in state government, increased the risk in an already risky project. Most Medicaid claims systems contain bundles of code that have been tinkered with for decades to adjust rates, services and rules. Attempting to translate all of that human intelligence, gathered over thousands of person-years, into a system built from the ground up, was, at best, problematic. "It was a big misstep," Frame says.

But Thompson argues that the state was in a corner.

Maine's budget was tight. State revenue was dropping, and saving money was critical. Also, the deadline to become compliant with HIPAA was looming, and Thompson decided that the six months that would have been needed to redo the RFP was too much. "We had a requirement to get something in place soon," Thompson says.

In October 2001, the state awarded the contract to CNSI, giving the company 12 months to build and deploy a new high-end

long hours writing code. Errors kept cropping up as programmers had to reprogram the system to accept Medicaid rule changes at the federal and state levels. The changes created integration problems. The developers also had to add more storage capacity and computing power to accommodate the increase in information generated by the new rules, and that further delayed the development.

In January 2003, John Baldacci was inaugurated governor. One of Baldacci's campaign promises was to streamline state government, and part of the plan called for merging Maine's Department of Behavioral and Developmental Services with the Department of Human Services to create the Department of Health and Human Services (HHS). That meant consolidating systems and databases that had resided in both departments and creating new business processes, diverting crucial resources from the development of the claims system. Thompson says the merger also diverted executives' attention. Meanwhile, the cost

**In an attempt to catch up,
THE I.T. STAFF BEGAN TO CUT CORNERS.
Testing the system from end to end was dismissed as an option.**

processing system by the HIPAA deadline of Oct. 1, 2002. As head of procurement, Thompson signed off on the contract.

Almost immediately, it became evident that the state was not going to meet the deadline. To begin with, the 65-person team composed of DHS IT staffers and CNSI representatives assigned to the project had difficulty securing time with the dozen Medicaid experts in the Bureau of Medical Services to get detailed information about how to code for Medicaid rules. As a result, the contractors had to make their own decisions on how to meet Medicaid requirements. And then they had to reprogram the system after consulting with a Medicaid expert, further slowing development.

The system also was designed to look at claims in more detail than the old system in order to increase the accuracy of payments and comply with HIPAA security requirements. The legacy system checked three basic pieces of information: that the provider was in the system, the eligibility of the patient and whether the service was covered. The new system checked 13 pieces, such as making sure the provider was authorized to perform that service on the date the service was provided, and the provider's license. "There were a lot more moving parts," Thompson explains.

Looking back, Thompson says the DHS team was seriously understaffed. But Thompson says he was afraid to ask for more resources. "That is a significant problem in government," Thompson says. "If I say I need 60 to 70 percent more staff because we need to work this project for two years, the response would be, 'What, are you crazy?' So, we just couldn't make the turnaround times."

In the fall of 2002, just months away from the HIPAA deadline, the DHS team got a reprieve. The federally run Center for Medicare and Medicaid Services pushed back the deadline to Oct. 1, 2003.

For the next two years, CNSI and Maine's DHS IT shop worked

of the project rose, increasing 50 percent to more than \$22 million.

The IT staff could not meet the extended HIPAA deadline. In an attempt to catch up, they began to cut corners. For example, testing the system from end to end was dismissed as an option. The state did conduct a pilot with about 10 providers and claims clearinghouses, processing a small set of claims. But the claims were not run through much of the system because it was not ready for testing. Beyond a few fliers announcing the new system and new provider ID codes, HHS offered little or no guidance to providers on the use of the system. And there was no training for the staff who would have to answer providers' questions.

"We kept saying, 'Gosh, let's keep our head down; we can work through this,'" Thompson recalls. Instead, he acknowledges, he and other top officials should have taken a step back and analyzed the risks that the new system might pose for the state's Medicaid providers and their patients.

Early Warnings

Hitchings and his staff made the decision to go live in January 2005. The switch to the new system would be made in a flash cutover in which the legacy system would be shut down for good and the new system would take over. Codes identifying providers (tax identifier numbers) and Medicaid patients (Social Security numbers) had to be changed to meet HIPAA guidelines, and the legacy system would not be able to recognize the new numbers. Nor could it read the new electronic claim forms. HHS dismissed the idea of running a parallel system as too costly and complicated.

Maine officials did have one contingency plan: They would pay providers for two to four weeks if the new system failed. Under the interim payment plan, if a provider's claims were not being

The Adaptive Network

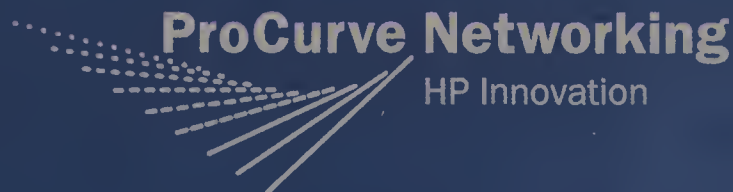
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processed in a timely manner, the provider would receive a payment based on the average monthly payment the provider had received the five weeks prior to the new system coming on.

On Jan. 21, Hitchings arrived at his office to find the claims system up and running. The initial reports from the contractor and his staff were that the system was humming along, quickly moving through Medicaid claims.

But the following Monday morning, Hitchings sat down with CNSI contractors to go over the file statistics for the system's first three days. Something wasn't right. The system had sent about 50 percent of the claims—24,000 in the first week alone—into a "suspended" file, a dumping ground for claims that have an error that is not significant enough to reject the claim outright but that are not accurate enough for payment. Typically, the error can be fixed fairly quickly by a claims processor. But the 50 percent rate was very high; the legacy system had suspended only about 20 percent of claims.

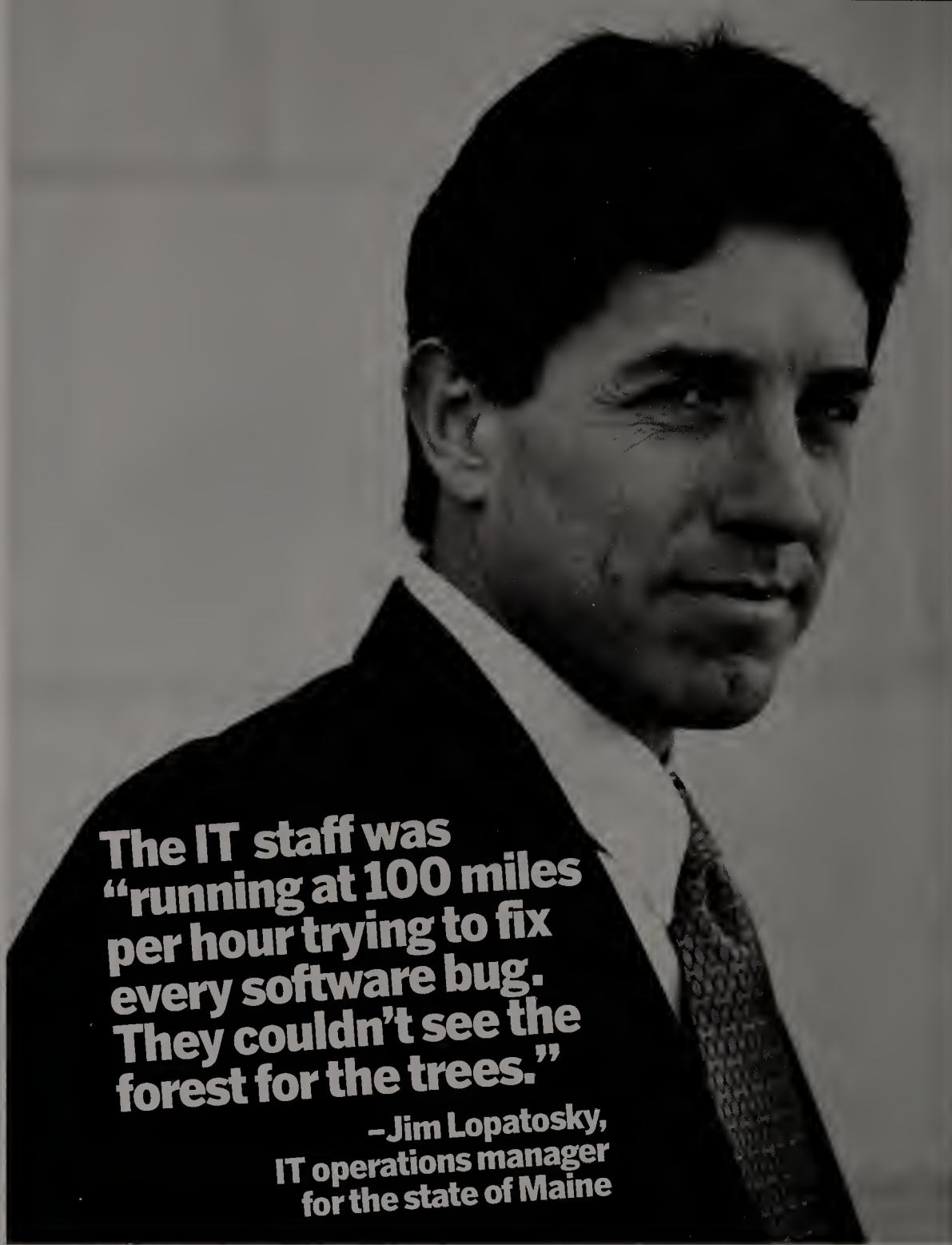
By the end of the month, angry calls from providers were mounting. One of the calls came from Kevin Flanigan, the only internist and pediatrician in Pittsfield, a town of 4,000 people in south central Maine. Early one morning at the end of January, Dr. Flanigan sat down with his business manager to go over the Medicaid payments that had arrived in that day's mail. Flanigan sliced open an envelope, pulled out the statement, and read "rejected." In the amount paid column, he saw "0.00." His manager opened a statement. Zero amount paid. "One after the other it said zero, zero, zero," Flanigan recalls. "My first reaction was that the state blew it, and it was no big deal. I could just call them up, straighten it out, and they'll send me a check."

Flanigan called HHS. He was told the problem was a computer glitch. The state would have it fixed in one or two weeks.

Flanigan went back to seeing his patients.

The glitch, however, kept sending tens of thousands of claims to the suspended file. Hitchings discovered that the system was suspending duplicate claims—claims from the same provider who had filed the claim a second time after learning the first had been suspended. The system was programmed to reject the second claim if it was identical to one already in suspension. With the capacity to work off only 1,000 claims a week, it would take the Bureau of Medical Services more than six months to clear all of them.

Hitchings and CNSI began to look at the code and the design of the system. They found numerous problems. For example, without adequate guidance from Medicaid experts, the system had been designed to accept files with up to 1,000 lines of claim data. But



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"running at 100 miles
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**—Jim Lopatosky,
IT operations manager
for the state of Maine**

many claims were much larger, some containing up to 10,000 lines, and the server was rejecting them automatically. The Medical Bureau staff asked providers to submit smaller files. In the meantime, the IT staff would try to rewrite the software.

At the same time, other errors began popping up. The state now owed health-care providers as much as \$50 million in Medicaid payments, and the backlog of claims had reached almost 100,000. Providers couldn't get through to HHS. When they didn't get a busy signal, the wait to talk to a staff person at MaineCare (formerly the Bureau of Medical Services) was a half hour or more. Providers began calling state legislators. A press conference was held on the steps of the state capitol Feb. 16, declaring a financial crisis for Maine health-care providers.

The calls were coming in so fast that Hitchings decided to man the phones himself. One call he remembers was from a woman in a provider's billing office. She was frustrated because the system would not accept her claim, no matter what she did. Hitchings walked her through the process, making sure she had the correct billing and file name conventions. After 45 minutes, the system still wouldn't accept the claim. Hitchings had to admit defeat.

"That was just so frustrating," Hitchings says. "I just couldn't fix the problem. I didn't know what more we could do."



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Technology
Developer
Partner



In Pittsfield, Flanigan opened more claim statements with no checks. He began to make plans to draw on a line of credit that used his office building as equity.

Over the next nine months, Flanigan would take out \$30,000 in loans to pay his bills.

A Call for Help

By early March 2005, Hitchings' staff and CNSI were overwhelmed. For \$860,000, the department hired XWave, an integrator and project management consultant, to take over the project. More people were hired to take phone calls. Gov. Baldacci, saying "enough is enough," ordered Commissioner Nicholas to have the claims system operable and running smoothly by the end of March.

**As of press time, Maine is the only state in the union
NOT IN COMPLIANCE with the Health Insurance
Portability and Accountability Act of 1996.**

But March came and went, and nothing changed. Desperate, state officials decided to change the program's management, and Rebecca Wyke, head of Maine's financing department, appointed Thompson as CIO in late March, replacing Harry Lanphear, who is now CEO of the Kennebec Valley YMCA. Thompson was put in charge of the project, and ordered to right the system as quickly as possible. (Lanphear could not be reached for comment.)

By the end of the summer, 647,000 claims were clogging the suspended claims database, representing about \$310 million in back payments. Interim payments were being made, but reconciling those payments with the claims was an accounting nightmare. Wyke hired the accounting firm Deloitte & Touche to audit the state books to determine if Maine would have enough money to pay Medicaid bills by the June 30 end of the fiscal year. The \$7 million contract also called for Deloitte to consult on how to reconcile the Medicaid bills.

XWave set up a project management office and steering committee that met weekly to establish priorities and monitor the progress of system software fixes. The goal was to get the new system to process claims at the same rate that the legacy system had, sending 20 percent into a suspended or rejection file. Thompson hired Jim Lopatosky, an Oracle database specialist in the state's Bureau of Information Services, as operations manager to act as a calming influence on the department's battered IT division. When Lopatosky took over in June, he encountered a staff "running at 100 miles per hour," trying to fix every software bug, with little direction on what was most important. "They couldn't see the forest for the trees," he recalls.

Lopatosky soon realized, as XWave had, that the system's problems could be laid at the door of poor project management and worse communication among the HHS IT staff, contractors and business users. For instance, programmers for the state and

those working for CNSI would work on parts of the system without telling each other what they were doing. Lopatosky prioritized tasks. He acted as a liaison between teams working on different functions. He directed the programmers to fix those software bugs that would resolve the largest number of suspended claims and postponed work on the portal through which providers could check on the status of claims. That could wait.

But the intricacies of the Medicaid program continued to thwart progress. Thompson needed a business owner who could clarify Medicaid business processes for the IT staff. Last October, Dr. Laureen Biczak, the medical director for MaineCare, agreed to take on that responsibility.

"This is what brought it all together," Thompson says. "It was

something we should have done from the start: have someone who knew the business [of Medicaid] working full-time on the project."

With Biczak's assistance, the Bureau of Information Services set up a triage process for the help desk. Medicaid business-process questions would be sent to the Medicaid specialists; software and hardware questions would be sent to IT program specialists. The triage process was implemented in January.

By the end of the month, Thompson claimed the new system could process 85 percent of claims as either pay or deny. "I can now see the light at the end of the tunnel," he says.

For the provider community, however, that light is still the headlamps of an oncoming train. Gordon Smith, head of the Maine Medical Association, says the new claims system is still far from what was promised: an advanced system that would clear claims faster, track costs better and give providers more accurate information on claims status. Smith disputes Thompson's claim, saying the new system still rejects 20 percent of the total claims, most of which meet accepted standards for payment. "Why are we comparing this system to a legacy system that wasn't good enough in the first place?" he asks. "Why spend \$25 million on a new system that isn't any better?"

For doctors like Flanigan, the entire ordeal—the postponed payments, the lack of communication with providers, the system's continued fallibility—will not easily be forgotten. Or forgiven. And it will certainly be on Flanigan's mind when he and others like him go to the polls to vote for governor in November.

"They are supposed to be protecting the most-at-risk people in the state," Flanigan says. "It goes beyond shock and dismay how utterly disrespectful the state has been to providers and patients." **CIO**

Washington Bureau Chief Allan Holmes can be reached via e-mail at aholmes@cio.com.

INSIDER RISK: The growing concern for CIOs



When it comes to insider risk what you don't know will hurt you

There's no doubt that security breaches are on the rise from many fronts, threatening the very health of enterprises. In 2005, over 52 million people were exposed to data security breaches and in over 100 incidents nationwide. And according to analysts, 70% of all security incidents come from insiders.

What's truly alarming, though, is that many executives think they're fully protected from these breaches and the insider threat. In reality, they've yet to scratch the surface when it comes to understanding and addressing all the risks. Although many executives have implemented basic protection measures to combat compliance violations, customer data loss and intellectual property theft, they only have visibility into half the insider risk leaving them only half protected.

"What executives may not know is that to protect against customer data loss, identity theft, intellectual property theft and compliance violations, you need to look at all insider risk including insider hacker activity, internet abuse and more. All forms of risk can identify a security breach before it occurs," says Brian Burke, research analyst for Framingham, Mass.-based IDC, a provider of market intelligence, advisory services, and events for the information technology and telecommunications industries.

Security breaches are often planned. Getting visibility during the planning stages can help to defuse a potentially devastating event. By monitoring all internal communication, executives understand who and what is occurring on their network to control the insider risk, compliance violations and customer data loss.

What would happen if a breach occurred within your organization and as a result

executive summary

In today's ultra-sensitive business climate, content risks abound. Most executives are aware of the obvious risks leading to compliance violations and customer data loss, but what about those they don't know about? And, while savvy enterprises have some protection in place, the growing variety of threats far outstrip most existing security measures, putting businesses' very health at risk. As a result, executives are leaving their enterprises wide open for attack.

According to a U.S. Secret Service and CERT Coordination Center Insider Threat Study, not only did 83 percent of the insider threat cases take place within the enterprise, but 81 percent of those incidents were planned in advance.

your company experienced:

- Unwanted media attention?
- Unwanted stakeholder attention?
- Unwanted government attention?
- Loss in consumer trust?
- Brand and reputation damage and more?

When it comes to content risks, executives need to look at the big picture to successfully protect their businesses from financial, legal and reputation damage.

“What if you had total visibility into all risks across your entire enterprise? And what if you had visibility into an attack three days before it occurred or even better, three weeks before it occurred?” asks Joe Cortale, senior vice president of worldwide sales and marketing for Denver, Colorado-based Vericept Corporation, a provider of comprehensive compliance and content control solutions. “Complete visibility means you can anticipate, defuse, and control threats before any real damage occurs.”

The Bad News: What You Don't Know Can Hurt You

Cortale warns that there is very little visibility into content risks posed by Internet abuse, insider hacker activity and other less-evident dangers. Frankly, executives aren't looking for other insider, less obvious activity, that is directly related to security breaches and legal risk. Nor do they realize that such rampant threats tend to go unchecked by many content monitoring solutions.

For example, another underestimated threat is insider hacker activity. Enterprises must not be lulled into thinking that all is well once the perimeter is secure. Insider hackers know the lay of the land and have the time necessary to organize lethal attacks.

The only way to thwart a hacker attack is with visibility into its early stages, which requires intimate knowledge of activities such as research, communication, downloads and application usage. Given the correct alerts to warn of suspicious insider activity, executives can take action before an attack occurs.

Would you know if:

- Internal hackers were conducting research on malicious hacking tools?
- An employee looking to leave the company is planning to take proprietary information and trade secrets with him?

- A disgruntled employee was planning a hacker attack with outside sources via an instant messaging session?

By correlating the risks in different areas, organizations will gain visibility into planned and unplanned behavior allowing them to act before any damage is done.

In addition, today more than ever, executives must be concerned with all forms of legal liability including sexual harassment, racism, defamation of character and violence in the workplace—any of which can jeopardize the business and result in lawsuits.

The Good News: What You Do Know Will Help You

“The rapid adoption of the Internet as a business tool definitely exposed enterprises to many forms of information loss, including identity theft, intellectual property loss, compliance violations, lawsuits and brand damage,” says Cortale.

“For highly regulated industries like healthcare and financial services, the greatest concern is obviously regulatory compliance,” says Burke. “But, unregulated industries have been focusing on protecting content, particularly intellectual property and customer data.” Whether inadvertent or intentional, exposure of such content by insiders can result in damage to the corporate brand that is more costly than any government fine.

The good news, says Cortale, is that enterprises are now gaining an understanding that combating threats to compliance violations, intellectual property theft and customer data loss from the trusted insider can be mitigated. By working with companies like Vericept, that provides 360° visibility and control over a corporation's digital assets they are able to successfully secure insider leakage points.

Content Monitoring Protection

With all these threats and so many unknowns, what are executives to do?

The key, says Cortale, is content protection from every angle, implementing a solution that provides visibility into the obvious and the not-so-obvious risks. “Although it's certainly a start, executives can't stop with just identifying compliance violations and intellectual property theft,” explains Cortale. “They need a solution that correlates all insider risk such as Internet abuse, rogue protocol usage, and insider

hacker activity—not to mention sexual harassment and racism. The correlation of risk from one area gives you visibility into other areas of risk.”

Be warned, many content monitoring solutions offer insight into only a portion of these risks, leaving enterprises open for attack and relying on basic reactive measures such as blocking and quarantining. Rather, executives need a solution that provides 360° visibility and control over enterprise content for maximum protection over digital assets.

Content Monitoring Check List

For comprehensive content protection, executives should consider the following in a content monitoring solution:

→ **Risk mitigation from every angle.** The key is to put a solution and strategy in place that considers risk from all angles. Again, many products in this space address only partial areas of risk (often merely half), so it's important to find a solution that addresses all risk. Being able to predict and defuse potentially damaging situations isn't worth its weight if large areas of risk aren't even on the radar screen. After all, it only takes one devastating security breach to cripple a business.

→ **Network, desktop and email control.** To identify and prevent all content risk, complete control is necessary. “That means, every part of the business—the network, desktops, email, Internet, IM, etc.—must be subjected to the same strict scrutiny,” says Cortale. The security platform must be comprehensive, with the tools and scope to identify security gaps, receive alerts for malicious internal activity and keylogger activity and ensure policy compliance.

→ **Content control.** Content control should encompass three key phases with automatic alerts for critical risk, compliance violations and leakage of highly-sensitive information. First, risk triggers must be in place to detect events that pre-warn an enterprise of an impending violation. Second, risk correlation should capture multiple violations in one event, where a single isolated event may go unnoticed. Third, content control technology is required to block and quarantine communications that infringe on corporate policy.

→ **Investigation management.** Effective compliance and content protection strategies don't start and end with monitoring. Investigation management completes the cycle, enabling enterprises to document and analyze violations for future planning or even legal proceedings. The right investigative tools will create an exact replica of the original communication. From there, case files must be created with full annotation and data mining capabilities to enhance analysis. Lastly, automated audit trail tools are needed to track access and changes to recorded violations.

Together, these components can help enterprises

The Vericept 360° Risk Management Platform

COMPLIANCE AND CONTENT PROTECTION FROM EVERY ANGLE

The Vericept 360° Risk Management Platform provides complete visibility into all insider risk and control violations before they occur.



Compliance Protection Provides insight into intentional or inadvertent violations of state and federal regulations and helps organizations provide evidence of compliance.

Intellectual Property Protection Monitors all forms of Internet-based communications and attachments to detect exposure of confidential information, checking for pre-warning activity.

Customer Data Protection Checks communication for leakage of sensitive customer data (addresses, Social Security Numbers, credit card numbers, account numbers, pass codes and driver's licenses).

Insider Hacker Activity Provides visibility into the early stages of an attack by identifying hacker activities such as hacker usage and

application downloads and capturing communication on backdoors, keylogger applications, and suspicious insider activity.

Excessive Internet Abuse Helps enterprises monitor and mitigate excessive Internet abuse in the form of gaming, shopping or viewing pornography.

Other Insider Risk Offers insight into sexual harassment, racism, defamation of character and violence in the workplace.

Rogue Protocol Usage Monitors rogue protocol usage to determine whether other security product controls are operating effectively.

to anticipate, defuse and control all threats—no matter what they are—before any real damage occurs.

The bottom line: An investment in content monitoring technology should be a no-brainer. Just make sure the solution provides total visibility into all areas of risk, providing compliance and content protection from every angle—or else, be prepared to face the consequences. Because viewing only half the risk is simply unacceptable.

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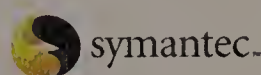
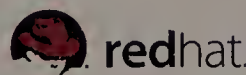
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The Three (or Four) Year Itch

To succeed, relationships require love and attention. That's why CIOs—especially mid-market CIOs with limited resources—should factor in the costs of hand-holding when going offshore.

BY STEPHANIE OVERBY

There's a sense of relief in Scott Testa's voice as he talks about terminating the last of his company's offshore outsourcing contracts this summer.

As COO and CIO of Mindbridge, an intranet software provider, Testa has overseen engagements with a handful of Indian IT service providers since 1999. In the beginning, the lure of lower costs from offshore outsourcing was hard to resist. And indeed, through 2002, Testa couldn't have been happier with the results. He was saving his mid-market company 30 percent on the application development and maintenance work he otherwise would have sourced domestically.

But by 2003, Testa began to see the benefits slip away. Staff turnover at the Indian vendors increased. The quality of work on offshored projects decreased. And Testa's internal staff was growing weary of the time and travel required to keep the relationships on track.

Things finally reached a breaking point last year. "[Offshore outsourcing] made a lot of sense for us at one time," says Testa, who will sever ties with the last remaining Indian vendor in June. "But it made a lot less sense for us in 2003. And by the end of 2004, it was right there in our face. It just wasn't nearly as cost-effective—or effective—for us anymore. We'd get better quality and lower costs by doing the work domestically."

Testa's experience is a sign of the outsourcing times. In the late '90s and early part of this decade, many CIOs jumped on the offshore outsourcing bandwagon. They were either

Reader ROI

- :: Why the value of offshoring often dips after three years
- :: What to do to keep the relationship fresh and productive
- :: How to know when it's time to bow out



Mindbridge CIO **Scott Testa:**
"It's a lot of work to manage
offshoring relationships. If you
don't put the resources and the
work into managing them well
long-term, you're destined to
have issues."

feeling the lure of potential savings or being pushed by CEOs or boards with similar dollar signs in their eyes. A surprising number of companies ended up going offshore first and figuring out a strategy later.

Now, as marriages arranged during the heyday of offshore outsourcing have matured, offshore outsourcing satisfaction rates have dropped. Last year, IT consultancy DiamondCluster International reported that the number of buyers satisfied with their offshoring providers fell from 79 percent to 62 percent, and the number of buyers prematurely terminating an outsourcing relationship doubled to 51 percent. Also in 2005, PricewaterhouseCoopers found that half of the financial services executives it surveyed were dissatisfied with offshoring.

Several years into the craze, expectations about offshoring have come crashing down to earth. In a recent study of offshore outsourcing results among financial services companies, Deloitte Touche Tohmatsu discovered that although offshore performance during the first few years was consistent with expectations, many companies encountered an alarming drop-off in both cost savings and quality after three years. "It is a lot of work to manage these relationships. If you don't put the resources and the work into managing this relationship well long-term, you are destined to have issues," says Testa. "That, quite frankly, is what happened to us."

Philip Hatch, founder of offshore outsourcing consultancy Ventoro, has also found a maximum ROI point occurs sometime before

well as developing the right metrics for judging performance, are keys to long-term offshore success.

"Unless an outsourcing engagement goes through some kind of reinvention, by five to seven years out, you're going to see no material cost savings over what you would pay to do the work yourself," Hatch predicts. "The outsourcing engagement will be obsolete."

The Honeymoon Years

Hatch compares the offshore cycle thus far to the dotcom boom and subsequent bust. In the early part of the decade, "people started screaming offshore. We saw CIOs being forced into offshore outsourcing relationships because of their boards, or executives selecting vendors solely based on their hourly rates," says Hatch. "Ninety-nine percent of them had no real business plan."

"A lot of these initiatives were driven by costs, essentially replacing expensive labor with cheap labor," agrees John G. Schmidt, president of the Integration Consortium, whose experience with offshore outsourcing dates back to the 1980s when he worked in the Consulting Services division at Digital Equipment Corp. "But the problem is making [offshore outsourcing] sustainable. The U.S. business mind-set is, What can I do in January to save money this year?"

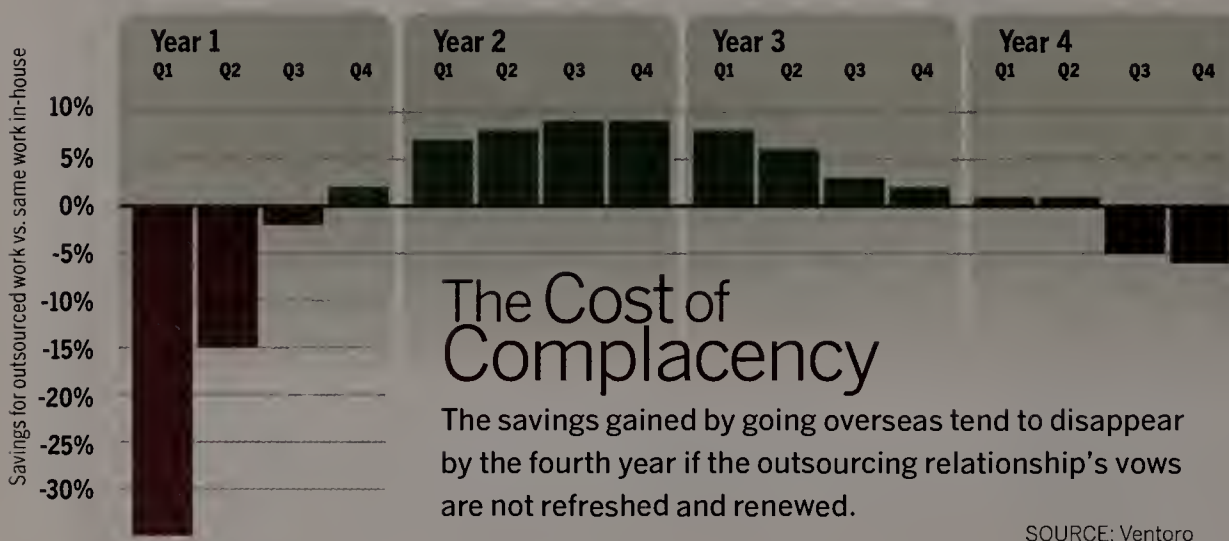
Although many IT leaders understood the effort required in the first year or two to launch an offshore outsourcing relationship, many were not prepared for the long-term effort it takes to sustain the value proposition. "People thought that outsourcing

was a panacea to cure all ills," says Testa of Mindbridge. "But we found that while it solves some problems, it causes others."

When Joe Drouin was promoted to CIO of car parts manufacturer TRW Automotive at the end of 2002, he inherited his predecessor's offshore outsourcing relationship with Indian vendor Satyam. The arrangement had originally been sought three years earlier by the company's then-new CEO. For awhile, the deal had worked well, Drouin says, but by the time Drouin came aboard it was beginning to show some signs

of wear and tear. Some projects were still successful; others weren't. The relationship was managed project by project, using a very formulaic approach for gathering user requirements. "It took a lot of effort to get it right," says Drouin, "and it didn't always happen." The result: missed deadlines, blown budgets and rework. And the developers Satyam assigned to TRW's projects were a mixed bag. "Some were good and some were not," recalls Drouin. "And we'd lose the really good ones whenever a project would finish. So every time we had a new project, we had to start all over with someone who had to learn the TRW environment."

Drouin renegotiated the contract with Satyam to provide a dedicated offshore development center that would engage vendor staff



the first three years are up. "After you hit that [three-year mark], unless there is some additional external force, things get stale," says Hatch, who worked for Russian outsourcer Luxoft from 2000 to 2003. "Turnover rates on the outsourcing team pick up. The methodologies and tools that worked well in the beginning become obsolete. And other soft costs creep in," he says.

CIOs who are just beginning to evaluate the offshore option could benefit from the lessons learned by those who have gone before them. Even before they make the decision to offshore, CIOs should factor in the costs involved in keeping a long-term offshoring relationship from becoming stale. Smart CIOs have figured out that continuous tweaking and constant attention, as



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in long-term commitments to address the turnover issue and remove some of the risk of managing the work project by project. "We started building up a good base of TRW-specific and automotive domain knowledge," says Drouin. "We didn't have to reintroduce ourselves or start from scratch each time." And for the first year after reorganizing the relationship, the offshore outsourcing worked swimmingly.

But it wasn't to last.

Romance Fades

In the beginning of any offshore relationship, both customer and vendor expend a Herculean amount of effort to get the relationship up and running smoothly. "The new customer signs on. There's lots of fanfare and press. All the vendor employees want the gig, and the vendor puts his aces on your team," Hatch says. "They build out new facilities. They buy new software and hardware. The vendor comes in and spends a significant amount of time and money to close the deal."

On the customer side, CIOs and their staffs spend time and money evaluating vendors and putting a new management structure in place to support the offshore environment. A manager is assigned to oversee the relationship, often making repeated trips overseas to oversee vendor performance. "Traveling to India or China or the Philippines every quarter to manage operations or vendor relationships works OK for the first year or 18 months," says Chris Gentle, director of research for Deloitte and Touche. "But when you're doing it for two or three years, it takes a lot out of people."

Several years out, weariness and complacency often sets in, what Gentle calls "offshore fatigue." Mindbridge's Testa recalls that in his shop, problems would start to come up that couldn't be solved with IM or e-mail, and one of his managers would have to jump on a plane to India the next day. "It's definitely fatiguing, physically and psychologically," he says.

The key, says Gentle, is to make sure you rotate new people into the offshore relationship manager position every couple of years to prevent burnout. Satyam's offshore operation for TRW has grown to 150 employees, and Drouin says it's about time he had a TRW Automot-

The Captive Option

Companies interested in long-term offshore outsourcing are increasingly opening their own operations overseas

AS PROBLEMS WITH LONG-TERM OFFSHORE CONTRACTS, such as growing turnover and diminishing quality, become more pronounced, captive offshore operations—in which a company opens its own offshore subsidiary—are gaining favor. The captive model gives a company complete control over offshore operations and, by eliminating the middleman, can boost savings. In fact, Deloitte Touche Tohmatsu found that among financial services companies, captive operations appeared to be more capable than offshore contracts of improving savings and quality over time.

Some companies may choose to go the captive route from the get-go, but more often than not it's a model they develop after working with an offshore vendor for a few years. Some offshore vendors even offer a "build-operate-transfer" model that allows a company to purchase the offshore center from the vendor after a specified period of time.

But the captive model isn't right for everyone. If your offshoring needs are small, it wouldn't make much financial sense to set up an offshore subsidiary. Similarly, if you want to outsource a particular technology that an offshore vendor has spent years building a practice around, you might get better performance from the vendor than you would from your own captive operation. But if you're going to have 2,000 workers offshore or have specialized needs, a captive center is often a better option.

Some companies, like Lehman Brothers, end up splitting the difference with a hybrid model, setting up their own offshore subsidiary and supplementing that with offshore vendor relationships. Last February, Lehman CIO Jonathan Beyman set up a captive center in Mumbai, India, that is focused on very high-level work such as developing and maintaining Lehman's proprietary software. It's the kind of work Beyman isn't comfortable handing off to a third party, particularly when turnover is such an issue. "Hopefully we've set up an organization where that's not as much of a problem," Beyman says. And in the captive center, "IT and industrial engineers can get together and figure out how to redesign business processes and solve things that are not purely technical problems, but social problems."

The captive center currently employs 300 people and is scheduled to grow to 600 by the end of the year. But Lehman continues to maintain outsourcing relationships with Indian vendors Tata Consultancy Services and Wipro, which have a total of 400 workers attached to lower-end projects, such as QA testing and infrastructure support, for the financial services firm.

—S.O.

tive employee onsite in Chennai, India, to oversee the vendor's work. "There's only so much you can do on each visit. They focus on a couple of specific things each time they're out there," says Drouin. "Once you get to this scale, you need someone on the ground day in and day out making sure you get the most from your investment."

Travel is not the only thing that can sap those managing an offshore relationship. TRW hit its ROI sweet spot with Satyam about a year after Drouin set up the offshore center. Productivity hit an



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Offshore Outsourcing

all-time high, with the offshore center delivering consistently on-time, on-budget, and on-spec projects and support. "But it took us so much effort to get to that level," Drouin says. "Then we kind of backed off, assuming things would run smoothly."

Complacency can set in on the vendor side as well. A. Vinod, vice president of IT for a \$1.8 billion manufacturing company that Vinod would prefer not to identify, says that over the years, he's seen dwindling vendor executive involvement in his four-year relationship with Sierra Atlantic, a Fremont, Calif.-based company with offshore development centers in India. "Early on, when our account was growing, their executives made frequent visits to help cultivate the relationship. There were constant calls and status reports," Vinod recalls. "But over time, executive visibility has shifted quite a bit. Deliverables were never missed. But the visits diminished in frequency and face time with them was reduced."

Vinod continues to push for more involvement from Sierra's executives and advises others in a similar situation to do the same. "You have to demand that," he says. In the event that executives are not responsive, Vinod (who has a small four-person dedicated center at Sierra in Hyderabad, India, but also pays Sierra Atlantic for additional projects and support as needed) puts his money where his mouth is. "I tell my vendor, if you want to know how the relationship is going from my end, just look at quarter over quarter billing," he says. "If you're making less money on us, you've got something to worry about. Come over and talk to us."

Long after an offshore relationship has ramped up, quarterly meetings between senior-level management at both customer and vendor are a must, Hatch agrees. And if vendor executives aren't asking how they can improve performance, there's a problem. "It's a huge red flag if the vendor isn't coming to you periodically with suggestions on how to optimize the engagement," he says.

Right-the-First-Time Metrics

One issue offshore vendors are notoriously stubborn about is performance metrics. If left to their own devices, many would just as soon stick with the metrics they brought to the table on day one, particularly if those benchmarks make them look good. But the metrics often offered up by offshore vendors—simple cost or man-hour figures, ratios of onsite to offsite staff, errors per thou-



Joe Drouin, CIO of TRW Automotive, renegotiated his contract with an offshore outsourcer to set up a dedicated center in India that would engage the local staff and cut down on turnover.

sand lines of code—may not be useful. Over time, it's the customer who must push for new, more meaningful metrics. "Trying to figure out what's the right metric to use is the area where we spent the most hours," says Vinod.

The majority of work Sierra Atlantic does for Vinod's manufacturing company is in the area of application support. Throughout the day, a series of tickets are opened as Vinod's users report problems with applications (anything from a password that needs changing to a program that malfunctions). Those tickets are passed to the offshore team. They look at the problem and make an attempt to resolve it. The metrics Sierra Atlantic has used all along to measure its application-support effectiveness were things like how long an open ticket sat in a technician's queue or how many hours that technician worked on the problem. And according to those numbers, the vendor was doing a bang-up job.

But on the other side of the world, Vinod was seeing the back-

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log of new tickets inch up every day. "The Sierra Atlantic team thought they were doing a great job. They were publishing this report that showed they were squeaky clean," he says. "But their metrics didn't mean anything at all. None of these metrics helped drive the only goal—ticket closure with a satisfied user." And since there was an increasing number of tickets being entered into the system, Vinod suspected problems were not being resolved on the first or even second try.

The offshore support team had no way of knowing whether the solution they tried actually resolved the original problem (they worked during the day in India, while it was night back in the United States) and, with the performance metrics Sierra Atlantic had in place, the support staffers had no impetus to follow up and find out the net result. So Vinod brought the entire offshore support team (at considerable cost) to his headquarters in Ohio, where he thought they'd feel more connected to the company and more accountable to users. And sure enough, the backlog decreased. "We got the numbers back, and they were fantastic," he says. "Once in the U.S., they were held to the only metric that was important to us—two-day closure of every ticket." Of course, Vinod can't keep the entire support team in Ohio full time. He's still working with Sierra Atlantic to figure out the right mix of offshore and onshore vendor staff and new processes to make it work.

Drouin says his team has also had a tough time figuring out what numbers will paint a more meaningful picture. His offshore management team recently added a number of metrics to track resources, projects and network availability, which are delivered monthly to Satyam's offshore project managers and TRW's project champions. More importantly, they're working to finalize a next generation of metrics whose inspiration comes from the world of manufacturing. Drouin calls them right-the-first-time metrics, an

IT corollary to the manufacturing metric "first-time yield."

"Rather than the number of bugs per line of code, we want to figure out how many times we get something that's just right out of the box from the vendor, or close enough to just right that we don't have to kick it back to them," Drouin explains.

The Truth About Turnover

Lately, Drouin has been focused on turnover metrics. Satyam itself tracks when an employee leaves the company. But for Drouin, it's when a Satyam employee leaves the TRW account that he feels the pain, even if that employee is still working for the vendor.

And like most CIOs who have been outsourcing offshore for more than three years, Drouin has been feeling that pain more than ever lately. He was aware of the well-publicized turnover rates in India, sometimes nearing 25 percent or 30 percent. "That's bad enough," he says. "But you can have a specific project team and experience 100 percent turnover overnight. That's a tremendous impact, and projects can ground to a halt."

Indeed, one of TRW's biggest offshore projects came to a dead stop *twice* last year because the entire project team on a product data management (PDM) system to support TRW's engineering work left overnight. "They literally walked across the street to join another vendor to work on some giant ERP project," Drouin says.

It was particularly costly because of the type of project. "If it's a SAP project, we know that Satyam has a whole host of SAP talent they can bring to bear," Drouin says. "But if it's something more specialized like PDM—they didn't have a wealth of resources in that area. And it took them time to go outside and find people." The defection led to lengthy delays in project completion that made TRW's VP of engineering none too happy. "It significantly slowed

7 Steps to a Successful Offshore Relationship

1. Don't assume the hard work is over after the ramp-up period.

Healthy offshore relationships require continuous improvement throughout their lifecycles and extensive re-examination every three years.

2. Hold quarterly meetings with

senior-level representation from both customer and vendor.

3. Rotate people out of the relationship management position after a few years to prevent burnout. Or consider having someone permanently onsite at the offshore location. The travel required to manage relationships offshore can take a toll on employees.

4. Keep close tabs on vendor staff turnover. Pay attention to all levels, from the executive ranks to middle managers to line workers; defections at any level can have a negative effect.

5. Work with your offshore provider to cushion against the sudden loss of key employees. For example, on an important project place an extra resource who can be ready to jump in if necessary.

6. Make sure performance metrics mesh with reality. If they don't, come up with new metrics that do.

7. Survey business users and internal IT staff about their experiences with offshored support or projects on a regular basis. They can be your best measure of how well or poorly the engagement is delivering. —S.O.



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“The best people were being wooed away for more money. And the quality of people we got in their place wasn’t equal to the price we were paying.” –Scott Testa, CIO, Mindbridge

down a project aimed at increasing the efficiency of our engineers,” says Drouin. “It also impacted our credibility with the business, who began to doubt our ability to deliver the project.”

Drouin says Satyam has put some processes in place to help ease the impact of turnover. “The vendor has put a sixth person on a five-person project team as a buffer,” he says. “If someone leaves the project, they have a resource ready to jump in who’s already up to speed.” Ultimately though, says Drouin, turnover is simply something he has to factor into the cost of doing business offshore.

Indeed, Hatch’s research reveals a dramatic upswing in turnover on the vendor’s team during the second and third year of offshore outsourcing engagements. Testa of Mindbridge also found that the replacements his offshore vendors put on his projects were increasingly less skilled and experienced but cost just as much. “The best people were being wooed away for more money,” says Testa. “And the quality of people we got in their place wasn’t equal to the price we were paying.”

Lehman Brothers CIO Jonathan Beyman says turnover rates are part of the reason why he doesn’t send work that requires company-specific knowledge to third-party vendors in India. “They’re not putting someone on my account who’s going to stay there for the rest of his career. After a couple of years, I know there is going to be churn,” says Beyman, who has two contracts worth a total of \$70 million with Tata Consultancy Services and Wipro. “Having subject matter experts is something that’s very important to us. We’ve got employees internally that have worked on our systems for years and years, and we have not been able to duplicate that with a third party offshore.”

And that’s a big part of the reason some IT executives eventually turn to a captive model, where the company owns and operates the offshore center as its own subsidiary and employees report directly to them (see “The Captive Option,” Page 60). Beyman himself has gone to a hybrid model, with a captive center handling high-level work and vendors working on things like QA testing and infrastructure support.

Offshoring Is Hard Work

Ultimately, it’s clear that for offshore outsourcing to be successful long term, it requires continued reevaluation and renewal. The hard work is not over after the first couple of years; it’s only just beginning. Hatch advises CIOs to consider that and factor it in before they sign a contract with an offshore IT services provider.

“You have to make a holistic evaluation of the offshore propo-

sition that looks at total costs long term,” Hatch says. “Not just the launch costs, but the mature operational costs, including the relaunch that needs to take place every three years or so.”

Drouin builds long-term costs for increased turnover into his metrics so that he isn’t taken by surprise. “Don’t assume that the task of closely monitoring is limited to the startup phase. You’re going to have to maintain that level of attention—or close to it—throughout the relationship,” he says.

Beyman of Lehman Brothers made headlines in 2003 when he re-insourced the help desk he had offshored to India after nine months of terrible service levels. “The places where it works for us, it works because we spend a lot of time and attention on it,” he says. The places where it hasn’t worked, it hasn’t worked because it wasn’t managed well.”

Gentle of Deloitte and Touche says he saw a broad range of results in the cost savings being achieved offshore and the quality being delivered. Some companies were getting quality offshore that was 15 percent higher than on shore. Others were seeing quality about equal to that delivered domestically. And, “some were seeing quality start to dip below the level of quality available onshore, which defeats the whole value proposition of going offshore in the first place,” he says.

That’s where Testa found himself at Mindbridge. A once-beneficial offshore outsourcing arrangement deteriorated over time until he ultimately ended up in a situation with inexperienced offshore staff delivering him buggy software at no net cost savings. Unlike Drouin and Vinod who continue to work at offshore outsourcing and derive value from it, Testa called it quits. He is in the process of staffing up internally to meet Mindbridge’s application development and support needs, supplementing that with some domestic outsourcing. “I don’t plan to do any more offshoring in the foreseeable future,” Testa says. “It’s time-consuming and draining and, at times, extremely frustrating. You spend half the time patting people on the back and half the time kicking people in the ass.”

As the offshore outsourcing market has matured, the lesson for CIOs is clear. “Offshoring is not for the fainthearted. You can’t dabble in it,” says Deloitte and Touche’s Gentle. “You have to have a long-term strategy.” **CIO**

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A TYPICAL 10,000-SQUARE-FOOT DATA CENTER

consumes enough juice to turn on more than 8,000 60-watt lightbulbs. That amount of electricity is six to 10 times the power needed to operate a typical office building at peak demand, according to scientists at Lawrence Berkeley National Laboratory. Given that most data centers run 24/7, the companies that own them could end up paying millions of dollars this year just to keep their computers turned on.

And it's getting more expensive. The price of oil (\$60 a barrel in February) may fluctuate, but the cost of energy to run the data center probably will continue to increase, energy experts say. This is because global demand for energy is on the rise, fueled in part by: the proliferation of more powerful computers. According to Sun Microsystems engineers, a rack of servers installed in data centers just two years ago might have consumed 2 kilowatts and emitted 40 watts of heat per square foot. Newer, "high-density" racks, which cram more servers into the same amount of space, are expected to consume as much as 25 kilowatts and give off as much as 500 watts of heat per square foot by the end of the decade. The dire predictions keep coming. Most recently, a Google engineer warned in a research paper that if the performance per watt of today's computers doesn't improve, the electrical costs of running them could ultimately exceed their initial price tag.

"As the demand for computing grows, the cost of power is a larger and larger concern," says Dewitt Latimer, CTO at University of Notre Dame. Latimer is grappling with finding the space and adequate power to handle a growing demand for cheaper and ever-more powerful high-performance computer clusters at Notre Dame. The problem comes not just from the computers themselves; Latimer is

worried that the air-conditioning needed to keep the machines cool will also eat away at his budget.

Like Latimer, every CIO who is responsible for a data center—even those who outsource data center management to a hosting company—faces this conundrum: how to keep up with ever-increasing performance requirements while taming runaway power consumption. The problem is most pressing for companies on either coast and in large cities in between, where space is at a premium and companies compensate by putting more servers into their existing buildings. And there is no simple solution. Business demand for more applications results in companies adding more servers. According to market research company IDC (a sister company to *CIO's* publisher), server sales are growing by 10 percent to 15 percent annually.

Nevertheless, some CIOs with huge energy bills are developing strategies for containing power costs by deploying more energy-conscious equipment and by using servers more efficiently.

"There's no question that the issue of power and cooling is a growing concern," says John Humphreys, an IDC analyst. "The assumptions used for building data centers have been blown away."

Reader ROI

- :: Why energy consumption has become a headache for CIOs
- :: Ideas for reducing data center electricity use

THE PROBLEM: I.T. HOGS ENERGY

IT's energy woes have a lot to do with market factors that affect everyone who drives a car or turns on a light switch; at the beginning of the year, the price of a barrel of oil was more than double what it was three years earlier. The price of natural gas, which fuels many of the country's electric power plants, has also shot up. And anyone who thinks the current energy crunch is going away need only look at global energy markets.

The oil shocks in the 1970s and '80s stemmed from large, sudden cuts in supply. This time, it's different. While it's true that some of today's high prices stem from supply shocks tied to the U.S. invasion of Iraq and hurricanes on the Gulf Coast, the world's thirst for oil over the past 25 years has grown faster than the energy industry has been producing it. And with rapid economic expansion in China and India, those countries are demanding more and more energy, putting further pressure on the world's energy markets.

Servers in corporate data centers may use less energy than manufacturing facilities for heavy industries, but within a company, IT is an energy guzzler. "We're pretty hoggish when it comes to power consumption in the data center," says Neal Tisdale, VP of software development at NewEnergy Associates, a wholly owned subsidiary of Siemens. NewEnergy's Atlanta data center performs simulations of the North American electric grid to help power companies with contingency planning. "We turn on the servers, and we just leave them on."

The exact amount of electricity used by data centers in the United States is hard to pin down, says Jon Koomey, staff scientist at Lawrence Berkeley National Laboratory. Koomey is working with experts from Sun and IDC to come up with such an estimate. Nevertheless, most experts agree that electricity consumption by data centers is going up. According to Afcom, an association for

data center professionals, data center power requirements are increasing an average of 8 percent per year. The power requirements of the top 10 percent of data centers are growing at more than 20 percent per year.

At the same time, business demands for IT are increasing, forcing companies to expand their data centers. According to IDC, at least 12 million additional square feet of data center space will come online by 2009. By comparison, the Mall of America in Minnesota, the world's largest shopping mall, covers 2.5 million square feet.



More Efficient Computers

JUST AS AUTOMAKERS BUILT SUVs WHEN OIL prices were low, computer manufacturers answered market demand for ever-faster and less expensive computers. Energy usage was considered less important than performance.

In a race to create the fastest processors, chip makers continually shrank the size of the transistors that make up the processors. The faster chips consumed more electricity, and at the same time allowed manufacturers to produce smaller servers that companies stacked in racks by the hundreds. In other words, companies could

The Solar-Powered Server Farm

How one company got its data center off the grid

PHIL NAIL AND HIS WIFE, Sherry, have learned that green technology and data centers can go together. The couple started their Web-hosting company, Affordable Internet Services Online (AISO), nine years ago and switched to solar power in 2001. The company, located in Romoland, Calif., provides Internet service to customers that include a Laguna Beach, Calif., film production company and Veg-giedate.org, a dating service for vegetarians. The company

data center's 200 servers are powered by 120 photovoltaic panels that generate electricity on platforms mounted beside the data center.

According to Nail, the panels supply power to run the entire data center, including the offices and air conditioners. In case of a power failure, AISO can get power from its emergency generator (which runs on natural gas) or, as a last resort, the utility grid. The hosting company also uses servers with energy-efficient

Advance Micro Devices Opteron processors from Open Source Storage. "We built our company to be environmentally friendly because we thought it was the right thing to do," says Nail.

Nail acknowledges that a solar-powered data center isn't for everyone because startup costs can be expensive; in 2001, it cost him \$100,000 to install 120 solar panels for his 2,000-square-foot data center. He says his investment has paid off in low energy costs,

and his eco-friendly marketing message has helped to attract some customers. But he acknowledges that the cost of switching to solar power would be steep for a large data center with thousands of servers.

Now Nail is taking green power to another level. Specifically, the data center's roof, where he intends to put five inches of dirt and cover it with drought-tolerant plants. "That's supposed to reduce the amount of cooling needed by 60 percent," he says. —S.P.

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cram more computing power into smaller spaces.

Now that CIOs are beginning to care about energy costs, hardware makers are changing course. Silicon Valley equipment makers are now racing to capture the market for energy-efficient machines. Most chip makers are ramping up production of so-called dual-core processors, which are faster than traditional chips and yet use less energy. Among these new chips is Advanced Micro Devices' Opteron processor, which runs on 95 watts of power compared with 150 watts for Intel's Xeon chips. In March, Intel unveiled a design for more energy-efficient chips. Dubbed Woodcrest, these dual-core chips, which Intel says will be available this fall, would require 35 percent less power while offering an 80 percent performance improvement over previous Intel chips. And last November, Sun Microsystems introduced its UltraSparc T1 chip, known as Niagara, which uses eight processors but requires only 70 watts to operate. Sun also markets its Galaxy line of servers as energy-saving equipment.

"The manufacturers are getting better now," says Paul FROUTAN, VP of product engineering for Rackspace, which manages servers for clients in its five data centers. With more than 18,000 servers to watch over, FROUTAN has been worrying about energy costs for years. He's seen the company's power consumption more than

double in the past 36 months, and in the same period has seen his total monthly energy bill rise five times to nearly \$300,000.

Latimer, who oversees Notre Dame's Center for Research Computing, first appreciated the power consumption problem when the university decided to hire a hosting company to house its high-performance computers off campus. On-campus electrical costs associated with data centers have generally been rolled together with other facilities costs,

and so the \$3,000 monthly utility bill from the hosting company—for running a 512-node cluster of Xenon servers—came as a shock.

Notre Dame's provost recently called Latimer and other leaders together to talk about how to handle the increasing demands that a growing research program was beginning to place on the campus utility systems and infrastructure. Faculty members are requiring more space, greater electrical capacity and dedicated cooling for high-powered computers and other equipment such as MRI machines. Latimer's recent conversations with Intel, AMD, Dell and Sun about his plans to buy new computer clusters "have been very focused on power consumption," he adds.

**A survey of
19 data centers
found that**

**1.4 kilowatts
of power
are wasted
for every
kilowatt
consumed.**

—UPTIME INSTITUTE



The Latest in Cooling

IN SEPTEMBER 2005, OFFICIALS AT LAWRENCE Livermore National Laboratory switched on one of the world's most powerful supercomputers. The system, designed to simulate nuclear reactions and dubbed ASC Purple, drew so much power (close to 4.8 megawatts) that the local utility, Pacific Gas & Electric, called to see what was going on. "They asked us to let them know when we turn it off," says Mark Seager, assistant deputy head for advanced technology at Lawrence Livermore.

What's more, ASC Purple generates a lot of heat. And so, Seager and his colleagues are working on ways to cool it down more efficiently than turning up the air-conditioning. The lab is trying out new cooling units for ASC Purple and the lab's second supercomputer, BlueGene/L (which was designed with lower-powered IBM chips, but is nevertheless hot). Lawrence Livermore recently invested in a spray cooling system, an experimental method in which heat emitted by the computer is vaporized and then condensed away from the hardware. Seager says this new method, which holds the promise of eliminating air-conditioning units, would allow the lab to save up to 70 percent on its cooling costs.

It's not only supercomputers that create supersized cooling headaches. Tisdale, with NewEnergy Associates, says maintaining adequate and efficient cooling is one of the hardest problems to solve in the data center. That's because as servers use more power, they produce more heat, forcing data center managers to use more power to cool down the data center. "You get hit with a double whammy on the cooling front," says Rackspace's FROUTAN.

To address the cooling dilemmas of more typical data centers, hardware makers such as Hewlett-Packard, IBM, Silicon Graphics and Egenera have offered or are coming out with liquid cooling options. Liquid cooling, which involves cooling air using chilled water, is an old method that is making a comeback because it's more efficient than air-conditioning. HP's modular cooling system attaches to the side of a rack of HP computers and "provides a sealed chamber of cooled air" separate from the rest of the data center, says Paul Perez, vice president of storage, networking and infrastructure for HP's Industry Standard Server group.

More efficient servers help too. Last spring, Tisdale discovered that his data centers had reached their air-conditioning limit. While he had always imagined that a lack of physical space would be his biggest constraint, he discovered that if he ever lost power, his main problem would be keeping the air-conditioning going. Tisdale had replaced

Assess Your Energy Use

The **U.S. Department of Energy** is developing ways for companies to evaluate **HOW MUCH ENERGY** their data centers consume. Find out more at www.cio.com/041506.

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all 22 of his company's Intel servers in its Houston data center with two dual-core Sun Fire X4200 servers, part of Sun's new Galaxy line. The new servers are more energy-efficient, according to Tisdale. And so when he proposed installing the servers in Atlanta, he justified the purchase by arguing that he could avoid having to buy a bigger air conditioner, which would have used even more power. Tisdale said that according to company projections, the move will save electricity and reduce heat output by 70 percent to 84 percent.

What's more, there are better ways to use traditional air-conditioning. Neil Rasmussen, CTO and cofounder of American Power Conversion (APC), a vendor of cooling and power management systems for data centers, says CIOs should consider redesigning their air-conditioning systems, particularly as they deploy newer, high-density equipment. "Instead of cooling 100 square feet, it makes sense to look for the hot spots," concurs Vernon Turner, group vice president and general manager of enterprise computing at IDC.

Traditional cooling units "sit off in the corner and try to blow air in the direction of the servers," Rasmussen says. "That's vastly inefficient and a huge waste of power." Rasmussen argues that the most efficient way to cool servers is with a modular approach that brings cooling units closer to each heat source. Meanwhile, he adds, CIOs who manage data centers in colder climates should use air conditioners that have "economizer" modes, which can reduce the power consumption in the dead of winter. Newer air conditioners have compressors, fans and pumps that can slow down or speed up depending on the outside temperature.



A More Efficient Data Center

JUST AS AGING CARS ARE NOT AS FUEL-EFFICIENT as newer models, the majority of the country's data centers are using a lot more energy than they should. A survey of 19 data centers by the consultancy Uptime Institute found that 1.4 kilowatts of power are wasted for every kilowatt of power consumed in computing activities, more than double the expected energy loss.

However, like many people who aren't going to junk their older cars right away, many companies aren't ready to tear out their data centers to build new ones with a more efficient layout. "We haven't reached the point yet where it makes financial sense to rebuild most data centers from scratch," says Rackspace's Froutan. And so for most companies, the journey toward an energy-efficient data center will be a gradual one.

For NewEnergy Associate's Tisdale, that means retiring aging servers in one data center seven at a time and replacing them with

more energy-efficient equipment. But redesigning your data center also means making the most of what you have through server consolidation and, more specifically, the use of virtualization software.

Virtualization is a technology that allows several operating systems to reside on the same server. Froutan says that virtualization will help his data centers make do with fewer servers by allowing them to perform more tasks on one machine. In addition, he says, energy can be saved by deferring lower-priority tasks and performing them at night, when the cost of power can be three times less expensive. IDC's Turner agrees that CIOs need to improve server utilization in order to cut both power and cooling costs. Instead of building one server farm for Web hosting and another for application development, for example, they should use virtualization to share servers for different types of workloads.

Finally, advises APC's Rasmussen, if you are building a new data center, it's better to design it to accommodate the equipment that you need right now, rather than building facilities designed for what you might eventually need as you grow, as many companies have done. By using a more modular architecture for servers and storage—so capacity can be added when needed—a company can avoid such waste and still be prepared for growth.

HOW TO START SAVING

As CIOs search for more energy-efficient data center equipment and design, they need to educate themselves about which solutions will work best for them. As part of the information-gathering process, CIOs should establish metrics for power consumption in their data centers and measure how much electricity they consume.

There aren't many generally accepted metrics for keeping tabs on power consumption. But according to Turner, such metrics could include wattage used per square foot, calculated by multiplying the number of servers by the wattage each uses and dividing by the data center's total square footage. Sun has come up with a method called SWaP, which stands for Space, Wattage and Performance. The company says this method, which lets users calculate the energy consumption and performance of their servers, can be used to measure data center efficiency. John Fowler, executive VP of the network systems group at Sun, says sophisticated customers are installing power meters at their data centers to get more precise measurements.

It also pays to be an energy-aware buyer. When looking at how much energy a new server might use, "Don't just take the vendor's word for it," Fowler says. He suggests having a method for testing the server and its energy use before buying. However, the industry is still working on methods for comparing servers from different vendors in a live environment.

Ultimately, vendors' "eco-friendly" messages may resonate only slightly. NewEnergy's Tisdale, for example, still cares most about maintaining server performance. But he is impressed that new equipment will help him add more computing capability while maintaining current power usage levels. "Like a lot of people," he says, "I'm not interested in turning off the servers." **CIO**

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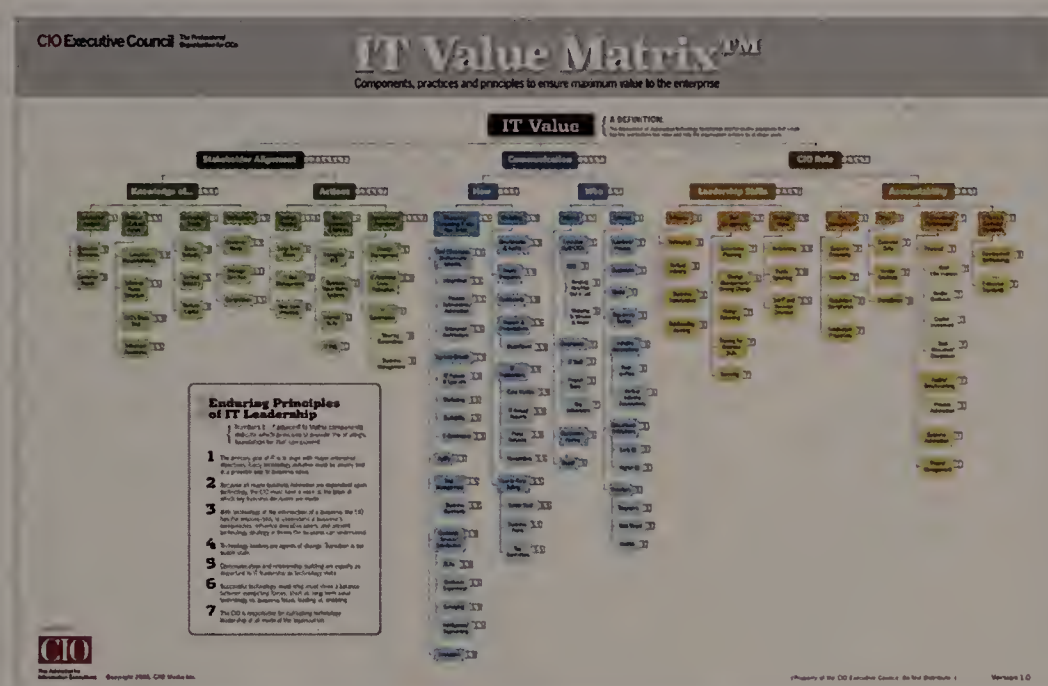
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little one finally arrives and you spend the next year subsisting on two hours of sleep a night. Fortunately, Holistic Beauty offers a range of products to help you through this transition:

■ *My Yogalates Video* combines the meditative qualities of yoga with the rigor of Pilates to tone flaccid muscle and get you in shape for baby #2!

■ *My Macrobiotic Cookbook* contains 120 mouth-watering recipes guaranteed to help you lose the baby weight. You'll never know how many delicious dishes you can prepare with cabbage until you buy this book.

And when the stress of being a new parent is just too much to bear, light *My Tranquility Candle*. Its mélange of warm Madagascar vanilla and calming chamomile is guaran-

teed to melt away tension. It works for colicky babies too!

To take advantage of this onetime offer, call 1-800-4SUCKRS.

-Belle Jolie, CEO of Holistic Beauty Inc.

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